SIERRA CLUB BULLETIN

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WILLIAM FREDERIC BADÈ

SIERRA CLUB BULLETIN

VOLUME XXII NUMBER I

FEBRUARY, 1937

THE GEOLOGIC HISTORY OF MOUNT WHITNEY*

By François E. Matthes

United States Geological Survey

To an eastern friend familiar with the Swiss Alps I recently showed an aerial photograph of Mount Whitney. "What!" he exclaimed, in evident disappointment, "is the summit of Mount Whitney flat and featureless? I had imagined our highest peak to be a towering rock monument with sharp, sky-piercing summit." "Yes," was my reply, "Mount Whitney's summit is merely a broad, gently sloping platform, which, I suppose, holds little appeal for an energetic mountaineer like you, but to a geologist specializing in the study of mountain uplifts and mountain sculpture that summit platform is a feature of quite unusual, indeed, altogether exceptional interest. I grant you that in point of spectacular beauty Mount Whitney cannot compare with the dazzling Jungfrau or the sharp-profiled Matterhorn, but, to one who can read it, the story told by its flat summit is far more significant and goes back to much more remote ages than any message conveyed by those glamorous alpine peaks. Indeed, the more fully I comprehend its story, by dint of repeated visits to and flights around and over Mount Whitney, the more venerable, the more precious seems that bit of flat land on its lofty summit. Upon it I have never set foot without a certain sense of reverence."

Whereupon I was requested to explain.

* Published by permission of the Director of the United States Geological Survey.

Broadly speaking, in a mountain region of great altitude that is profoundly and thoroughly dissected by canyons and valleys, sharp crests and pointed peaks are the rule; for the precipitous sides of the canyons and valleys lead more or less directly up to the dividing ridges and summits, and there meet one another at acute angles. If, in addition, a region so dissected has been intensely glaciated, the sharpness of its crests and peaks is likely to be still more pronounced; for glaciers widen more than deepen the canyons they occupy, and this widening is done at the expense of the intermediate divides. The widening process, moreover, is carried all the way to the extreme canyon-heads, and as a result these are enlarged from V-shaped gulches and ravines to broadly U-shaped amphitheaters, or cirques. Biting into the mountains from opposite sides these cirques transform the crests and spurs between them to attenuated comb-ridges or cleavers, and sharpen the peaks to three- or four-edged pyramids with concave sides. These types of mountain sculpture are familiar to all who have climbed in the Alps, or for that matter, in other strongly glaciated alpine regions. They are characteristic also of the High Sierra, and predominate in any extended view of it.

Mount Whitney's gently sloping tabular summit, it will be readily seen, belongs to an entirely different category. It is manifestly not an alpine mountain form. It could not possibly have been fashioned at its present high level by the erosional processes described. On the contrary, it is being destroyed by them; for, as the surrounding precipices continue to crumble and spall off, the platform will grow smaller and smaller until at last it will cease to exist. Evidently, it is a much older feature than any of the sharply sculptured alpine peaks around it; it is a remnant of an ancient landscape, the rest of which already has been carried away. What manner of landscape was this? How was it formed, and how long ago?

Be it understood, at the outset, that the Sierra Nevada, which is a huge tilted block of the earth's crust, slanting toward the west, is not the first mountain range to occupy the region east of the Great Valley of California. Long before it was uplifted, another mountain range, or to be more accurate, a system of mountain ranges, stood in the same place. And that earlier mountain system, itself, was a late comer in geologic history; for it arose in the Mesozoic era, the era of giant reptiles, only about one hundred million years

ago, after the earth had been troubled with spasmodic heavings and sinkings for upward of one and a half billion years.[1] A complete record of all those successive disturbances probably will never be obtained, for the evidences grow more and more fragmentary, the farther back they are pursued; but this much is definitely known, that during those vast stretches of time the area now occupied by the Sierra Nevada was alternatingly ocean-bottom and land, and when it was land it bore, as a rule, hills and even mountains of some height.

With those remote and as yet vaguely known events we need not further concern ourselves in this study of Mount Whitney—though merely to be aware of their occurrence gives us a tremendous perspective of earth history. It is with the mountain system that preceded the advent of the present Sierra Nevada that we must begin. What has become of it? Are any of its mountains and valleys still in existence? No, they have been completely annihilated, eradicated from the face of the earth; but fortunately some of the roots, if we may call them such, remain incorporated in the body of the present Sierra, and from these it is possible with some confidence to infer the structure and even the topography of those ancestral Sierras. They were carved evidently from great wavelike folds or wrinkles in the earth's crest produced by the buckling of originally flat lying strata, and they must have had the aspect of roughly parallel mountain ridges similar to those of the Appalachian system but trending in general from northwest to southeast. These ancestral Sierras were in existence for nearly 80 million years and in that time were gradually worn down by the processes of erosion until nothing remained, presumably, but rows of hills in a lowland that sloped gently down to the sea. Between those hills, which were composed of the more obdurate rocks, the streams followed belts of less resistant rocks, mostly in northwesterly or southeasterly directions.

Then, about 50 to 60 million years ago, shortly after the dawn of the Cenozoic era—the era of mammals and the latest great time division of geologic history—began the first uplifts that led to the rise of the present range. They tilted the Sierra region and the country to the east of it toward the southwest, and as a result a new system of southwestward flowing master streams came into

[1] All figures of geologic time given in this paper are consistent with the new time scale based on age determinations of uranium ores and other radioactive minerals.

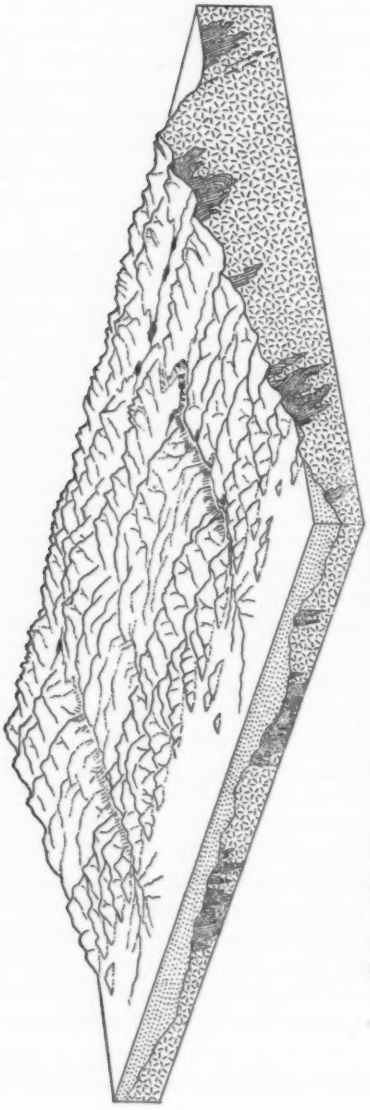

Figure 1—Idealized representation of a portion of the tilted Sierra block, showing the "roots" of the ancestral Sierras penetrating deep into the granite; also longitudinal crests and valleys. Vertical scale exaggerated.

existence; but many of the lesser streams between the ridges, unable to shift, maintained their southeasterly or northwesterly courses. Trenching deeper with every succeeding uplift, they eventually cut through the lowest of the folded strata and graved their valleys in the granite underneath — the granite which had welled up in a molten state from the depths of the earth and had crystallized under the folds of the ancestral Sierras. And so the northwest-southeast trend of those ancient mountains was perpetuated in the landscape of the present range.

Little attention—altogether too little—has been paid to the significance of the crests and valleys of the Sierra Nevada that trend in northwesterly or southeasterly directions, roughly parallel to the main crest-line and at right angles to the master canyons, which drain more or less directly down the western slope. These multiple crests, with their jagged peaks, have led us to speak, familiarly, of "the Sierras" and justify the use of the plural form. They are now seen to be the very oldest features in the landscape of the range, an inheritance from the long departed ancestral Sierras.

Some of the longitudinal crests of the Sierra Nevada are still composed of folded strata left from the earlier mountain system, but many of them are carved wholly out of granite. A striking example of the former kind is the Ritter Range, which is made largely of ancient folded volcanic rocks. The southeastward trending upper canyon of the Middle Fork of the San Joaquin, which parallels the Ritter Range as far south as the head of Pumice Flat, is cut in other volcanic rocks of the same relict mass, and closely follows the direction or "strike" of the upturned beds. On the other hand, the Clark Range and the Cathedral Range, in Yosemite National Park, are made entirely of granite, save for a few small patches of stratified rocks; and the upper Merced Canyon and Lyell Canyon are cut in granite throughout. The Le Conte Divide, again, is carved out of an isolated mass of stratified rocks, and Goddard Canyon is excavated in the same dark-hued materials. Both trend with the northwesterly strike of the beds. By contrast, the Kaiser Crest, above Huntington Lake, and its southeastward extension, the Kaiser Ridge, together form a continuous rampart of granite 25 miles in length. (Only one small strip of marble remains near the Twin Lakes, north of the Kaiser Crest.) And the South Fork of the San Joaquin has cut its northwestward trending canyon

in granite all the way from the head of Blaney Meadow to its junction with the Middle Fork.

Farther south, in the headwaters of the Kings River and in Sequoia National Park, where the folded structures of the ancestral Sierras bend gradually south-southeastward, the principal lineaments of the High Sierra notably bend in the same direction, although they are carved for the greater part out of granite. There, to mention only those most directly related to our theme, are the Great Western Divide, which contains stratified rocks in the vicinity of Mineral King and in the Kaweah Group; the upper Kern Canyon, which is cut entirely in granite, along a nearly straight north-south fault; and, to the east of it, the culminating crest of the Sierra Nevada, which bears Mount Whitney and is composed of granite throughout.

The crest last mentioned deserves closer scrutiny. A distinct mountain range it is, stretching in a south-southeasterly direction for a distance of 17 miles—from the Shepherd Pass on the north, to the Cottonwood Pass on the south. Surmounted by seven of the eleven 14,000-foot peaks of the Sierra Nevada—Tyndall, Williamson, Barnard, Russell, Whitney, Muir, and Langley—and by several peaks only a few tens of feet below the 14,000-foot level, it is the most lofty of all the longitudinal crests of the range. Curiously, it is still unnamed, although it certainly deserves and needs a name much more than some of the subordinate crests that are well provided for in this respect. In the following pages the immediate need of a suitable name for that distinct and culminating topographic unit of the Sierra Nevada will be manifest, and accordingly a name is proposed for it here and now—*Muir Crest*.[2] Though not yet formally submitted for approval, that name will here be used, at least provisionally.

That the Muir Crest, like the other longitudinal crests cited, has inherited its southeasterly trend from the ancestral Sierras, seems hardly open to doubt, for there is nothing in the joint-structure of its granitic rocks that could have determined that trend. The Kern Canyon, to the west of it, differs, it is true, from the rank and file of longitudinal valleys in the Sierra Nevada in that its course is

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2 The small peak that bears Muir's name at present seems hardly commensurate in importance among the features of the Sierra Nevada with the greatness of the man whose love for the "Range of Light" inspired the movement for the conservation of its scenic treasures.

determined by a fault, a long fracture in the Sierra block, but, to judge from the older features of its landscape and from its great breadth, the upper Kern Basin as a whole has been developed from a very ancient valley and is essentially analogous to Center Basin and the canyons of East Creek and Sphinx Creek, to the north, and Cloud Canyon, to the northwest. It probably antedates the fault, though it is possible that the fault, too, is of great antiquity.

A number of features on the east flank of the Muir Crest, furthermore, point unmistakably to the former existence, several miles farther to eastward, of another longitudinal valley of great antiquity, a valley that long antedated the down-faulting of Owens Valley and the formation of the imposing east front of the Sierra Nevada. Most definite is the evidence presented by the eastern spur of Mount Le Conte which terminates in Lone Pine Peak, and by similar spurs east of Mount Langley. There is, therefore, ample warrant for the belief that the Muir Crest was developed, by valley-deepening to the west and the east of it, from a row of lowland hills, relics of the destroyed ancestral Sierras.

Is it then to be inferred, you may ask, that the summit platform of Mount Whitney is a remnant of one of those ancient lowland hills? A daring thought, it seems, yet that is precisely what its configuration appears to indicate. Indeed, that summit platform has, so far as it is preserved, all the characteristics of a lowland hill. Its gentle westward slope could not possibly have been fashioned by ordinary erosive processes at its present high level, 3000 feet above steep-walled Whitney Canyon, but must have been graded with reference to a relatively shallow vale or valley at its western base. The depth of that ancient valley can be determined, at least approximately, by plotting, true to scale, the east-west profile of Mount Whitney's summit from the contour lines of the topographic map, and then extending that profile westward to the axis of Whitney Canyon in a curve such as might be expected in a landscape of subdued hills. The profile plot, shown in Figure 2, indicates a depth for the ancient valley of about 1500 feet. This figure can of course lay no claim to accuracy, for the contouring of Mount Whitney's summit on the small-scale map is necessarily generalized, but the curve is drawn in accordance with the principles of geomorphology, the science of land forms, and at least affords us a rough measure of the height of ancient "Whitney Hill."

The altitude of "Whitney Hill" above sea level naturally was much more than 1500 feet, for the hill was situated fully 50 miles in air line—more than 100 miles by the roundabout course of the Kern River—from the seaboard, which then lay not far from the foothills of the present range. From analogy with other lowlands produced

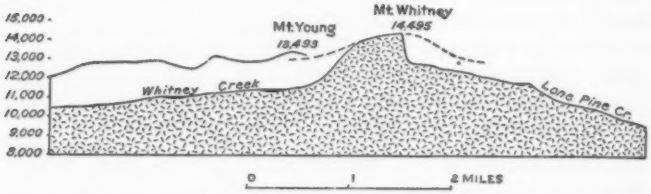


Figure 2—East-West profile of Mount Whitney. The broken line indicates the approximate outlines of ancient "Whitney Hill." Vertical scale same as horizontal scale.

by long continued erosion it may be estimated that the valley at the west base of "Whitney Hill" had an elevation of about 500 feet. Whitney Hill itself therefore rose probably as much as 2000 feet above the sea.

The landscape of the High Sierra affords many bits of supporting evidence for this interpretation of Mount Whitney's origin. In the first place, Mount Langley's summit, which is but a few hundred feet lower than Mount Whitney's, is of the same gently sloping tabular type. Its summit profile, when carefully plotted like that of Mount Whitney, and then extended westward to the axis of Rock Creek Canyon, indicates for the original "Langley Hill" a height closely comparable to that of "Whitney Hill."

Again, the Great Western Divide and its long north-northwestward and south-southeastward trending spurs, which must have originated in much the same way as the Muir Crest, bear several peaks with flat or gently sloping tabular summits. Most noteworthy is Table Mountain (13,646 feet), but hardly less typical, though less clean cut, is the tabular peak (13,300 feet) between Milestone Mountain and the Colby Pass, which might well be called Milestone Mesa. And on the Kern Ridge nearby are two more unnamed mountains with gently sloping summit platforms, 13,560 and 13,206 feet high, respectively. These tabular summits, ranging within a few hundred feet of one another in altitude, clearly represent remnants of a group of ancient hills. The fact that they average about

1000 feet lower in altitude than the comparable summits on the Muir Crest does not argue against the probability of their having been derived from the same ancient landscape as the latter, for the Great Western Divide stands 10 to 15 miles west of the Muir Crest and consequently about a thousand feet lower on the westward sloping body of the Sierra Nevada.

Farther north in the range still other tabular peaks dominate its sky line. Notable examples are Mount Darwin, which has two detached summit platforms, 13,841 and 13,701 feet in altitude, respectively; and Kuna, Koip, and Blacktop peaks, in Yosemite National Park, which together form a continuous platform 3½ miles long and ranging between 12,500 and 13,000 feet in altitude. Parker Peak (12,850 feet), Mount Gibbs (12,700 feet), and Mount Dana (13,050 feet) bear remnants of the same ancient undulating landscape. The acuminate peak of Mount Dana is the most prominent hill of all, but even it rises only 700 feet above the platform at its east base. To those who have first-hand acquaintance with these crests it is readily evident that their tabular summits, which decline steadily northward with the entire body of the range, represent isolated remnants of a once continuous landscape of moderate relief, an ancient lowland now raised to great height on the present range.

It is now in order to relate briefly how by successive steps lofty Mount Whitney has evolved from lowly "Whitney Hill." This story, of course, has to do primarily with the successive uptiltings of the Sierra Nevada and the cycles of erosion that were initiated by them. But where, you will probably ask, is the record of those uplifts to be found? In the features of the landscape itself. Professor Lawson was the first to spell out the principal chapters of that history from an analysis of the landscape of the upper Kern Basin, and that classic analysis will here be followed, though with certain modifications and additions indicated by the more complete knowledge now at hand.[3]

Be it observed, in the first place, that Mount Whitney outtops by fully one thousand feet all the other mountains in its immediate neighborhood that have rounded or gently sloping summits—notably Mount Young (13,493 feet) and Mount Hitchcock (13,188

[3] "The Geomorphogeny of the Upper Kern Basin," by Andrew C. Lawson, in *University of California Publications, Bulletin of the Department of Geology*, 1904, 3:15, pp. 305-330.

feet). The disparity in height is manifest in the aërial view looking northwestward over Mount Whitney and Mount Young. It is likewise patent from the profile plot in figure 2, which shows that the summit of Mount Young originally rose but a few hundred feet above the vale at the west base of "Whitney Hill." Mount Langley similarly outtops the rounded summit (13,481 feet) of the unnamed massif to the west of Rock Creek Canyon, as well as Lone Pine Peak (12,951 feet), to the northeast, and Cirque Peak (12,863 feet), to the south. The smoothly curving slopes of these lesser mountains, moreover, descend to levels close to 12,000 feet, and appear to have been fashioned with reference to much lower valley-floors than the summit platforms of either Mount Whitney or Mount Langley. It is to be inferred, therefore, that the initial uplift of the region caused the streams to intrench themselves a thousand feet or more on both sides of the Muir Crest. During the ensuing stillstand of the earth's crust their valleys widened gradually and the mountain slopes were worn back to moderate angles. Mount Whitney, as a result of this first uplift, probably gained some two thousand feet in altitude above the sea, and, because of the valley-cutting, came to stand 500 or 600 feet higher above its immediate base. Moreover, long spurs were carved on both sides of the Muir Crest, spurs such as are now represented by Mount Young and Lone Pine Peak.

To the west of Cirque Peak, and about 1500 feet below the level of its rounded summit, is an undulating plateau that stretches unbroken for a distance of seven miles toward the Kern Canyon. The principal valley on that plateau, broad and level, goes by the name of Siberian Outpost. For the summit tract, which is of far greater extent than the valley, and even more frigid and more windswept, the name Boreal Plateau has recently been proposed. This plateau unquestionably represents a large remnant of an erosion surface of moderate relief that was formed throughout the upper Kern Basin during a prolonged period of erosion following a second great uplift. Other remnants of this ancient erosion surface are Guyot Flat, to the northwest of Mount Guyot, and the Bighorn Plateau, between Wallace Creek and Tyndall Creek. The valley profiles for this stage of development of the upper Kern Basin are not all drawn at the time of this writing, and consequently only rough estimates can here be given for the magnitude of the second uplift and the consequent further gain in height of Mount Whitney. The peak was

raised presumably about 3000 feet higher, and therefore attained an altitude of, roughly, 7000 feet above the sea. As a result of further valley cutting by Whitney Creek its height above its west base was increased probably to somewhat more than 2000 feet.

About 1500 feet below the general level of the Boreal Plateau, again, lie the broad, gently sloping rock-benches that flank the Kern Canyon proper. Representative of these is the Chagoopa Plateau, which rises from an elevation of 8600 feet at the canyon rim to about 10,500 feet at the base of the mountains. Those benches clearly are remnants of a former floor of the Kern Basin that was developed to great breadth during an erosion cycle following a third uplift. The magnitude of that uplift also can, for the present, only be estimated roughly. It amounted probably to some 2000 feet, and therefore raised the summit of Mount Whitney to an altitude of about 9000 feet.

The Kern Canyon itself was, of course, trenched in consequence of the last great uplift. That uplift took place, to judge from the best data now available, about the beginning of the ice age, and the canyon is therefore really a product of alternating stream and glacial erosion. Like the Yosemite, its upper portion was three times invaded and remodeled by a mighty trunk glacier, and to this repeated glacial remodeling it owes its pronounced U-shape. The depth of the canyon below the flanking benches of the Chagoopa cycle—2000 to 2500 feet—affords, nevertheless, no index of the magnitude of the uplift, for that event occurred but a short time ago, in the geologic sense, and the river has not yet had sufficient time to trench deeply. The cycle of erosion started by the uplift is still in full swing today, and the river doubtless will continue to trench for a long time to come. From studies made in the Yosemite region, meanwhile, it is evident that the last uplift of the Sierra Nevada far exceeded all previous uplifts in magnitude, adding about 6000 feet to the height of the central part of the range. It may be presumed, therefore, that the Muir Crest also was raised at least 6000 feet, and that Mount Whitney thereby gained substantially its present altitude.

The recency of the last uplift accounts also for the slight headway which Whitney Creek has made in cutting its valley down to the level of the main canyon. Like Wallace Creek and Rock Creek, it has cut a gulch only one mile long, and through that gulch it

tumbles precipitously from a gently sloping untrenched upland valley, a "hanging valley" comparable to those of the Yosemite region. It follows that that upland valley has not yet felt the effects of the last cycle of erosion and still is a part of the landscape of the Chagoopa cycle, modified, of course, by glacial action.

The extent to which the upland valley of Whitney Creek has been remodeled by glacial action varies considerably in its different parts. In its lower portion where the ice never exceeded 600 feet in depth—as is shown by the lateral moraines—the valley suffered but moderate changes, but at the immediate base of Mount Whitney, where the two branches of the "Whitney Glacier" coalesced, a radical transformation was effected. The ice there attained a depth of over 1000 feet, and because of this greater depth and the longer duration of its action, it was able to add several hundred feet to the depth of the canyon and even more to its breadth. There can be no doubt that the present broad U-shape of Whitney Canyon was evolved by glaciation from a relatively narrow preglacial V-shape, but so thoroughgoing has been the transformation that it is difficult from the present topography to judge what the preglacial features may have looked like.

During the first half of the ice age there also took place the tremendous dislocation of the earth's crust that resulted in the formation of the imposing eastern front of the Sierra Nevada. Opinions of geologists still differ as regards the precise nature of that dislocation, but it seems probable from the latest field data now at hand, that it consisted in the main of a sinking of Owens Valley between parallel faults at the bases of the Sierra Nevada and the Inyo Range; also, that this subsidence occurred after the Sierra Nevada had attained approximately its present height and had suffered its first glaciation. The dislocation probably was not instantaneous, but was effected by many successive jerky movements spaced at intervals over a period thousands of years in length.

While it was thus growing, the eastern front of the Sierra Nevada was constantly subject to erosion, the more intense because of its steepness, and so it became deeply gashed by canyons and gulches. The extent to which it has been dissected and worn back is at first difficult to evaluate. Standing on the extreme summit of Mount Whitney, at the brink of its great east-facing cliff, one is apt to gain the impression that the fault fracture is right at one's feet, yet

it is manifest from the projecting spur that terminates in Lone Pine Peak, and from the long spurs to the east of Mount Langley, all of which bear remnants of ancient erosion surfaces, that the original fault escarpment must have stood at least four or five miles east of Mount Whitney's summit.

Stream erosion on the eastern front of the range was supplemented at least twice by glacial erosion, most vigorously at the heads of the canyons and gulches, less so toward their lower ends. Capacious cirques were developed on the northerly and easterly sides of the peaks, and as the curving cirque walls receded under the combined attacks of quarrying glaciers and rock-splitting frosts, they bit deeper and deeper into the body of the Muir Crest, destroying the old preglacial slopes and spurs, carrying away even the main divide, as in the stretch between Mount Whitney and the Whitney Pass, where only the western slope now remains. In some places, as to the south of Mount Le Conte, the divide, attacked from both sides, was transformed to a narrow, pinnacled comb-ridge; elsewhere, as between Mount Whitney and Mount Russell, it was reduced by the headward quarrying of opposing glaciers to a low, frail rock-partition, and in a few spots, as between Mount McAdie and Mount Mallory, the divide was demolished altogether and replaced by a smoothly concave saddle or col.

A very massive, full-bodied mountain preglacial Mount Whitney must have been, else it would have been reduced, like its smaller neighbor, Mount Russell, to an attenuated alpine crag. To judge from its present outlines, its entire eastern half has been cut away by cirque glaciers. Those glaciers were small but doubtless long-lived, by reason of their unusually favorable locations, and they probably carried on their destructive work not only during each glacial stage but also for long periods during each interglacial stage and throughout most of the postglacial interval. They have vanished only quite recently, and even today frost sapping at the base of Whitney's cliff is promoted by lingering snowdrifts.

From the north side of the mountain a broad slice was removed by the widening of the glacial canyon that lies between it and Mount Russell, and on the west side the lower preglacial slope was destroyed by the glacial widening of Whitney Canyon. The southeast side lost a small slice as a result of the incision of a narrow cleft, the northernmost of the series of clefts that gash the crestline at intervals

for more than a mile to the south of Mount Whitney. These clefts—the breathtaking "windows" that afford occasional peeps to the eastward from the trail—are not glacial features, but have been etched out, so to speak, by frost action seconded by snow avalanches along vertical zones in which the granite as a result of ancient faulting movements is sheared into thin, fragile plates. Only on its southwest side Mount Whitney still retains its preglacial slope approximately intact and there connects with the equally unglaciated western slope of the main divide.

One of the most astounding features of Mount Whitney is that, although situated in the center of a district from which glaciers formerly radiated in all directions, its own summit platform and the upper portions of its sides have remained unglaciated. Not the slightest evidence of glacial action, whether in the form of polish, striæ, or moraines, is to be found on the summit platform; and as for the canyons at the immediate base of the mountain, these, it is clear from the moderate height to which their walls appear smoothed by lengthwise glacial corrasion, were never filled with ice to more than one-half of their depth. The effects of glacial corrasion which they exhibit are, of course, only those produced by the later glaciers, but it is manifest from the height and the gradients of the older moraines on the sides of Whitney Canyon that the earlier glaciers, there as in other parts of the Sierra Nevada, had no greater depth in the cirques and upper canyons than the later glaciers.

A similar dearth of glacial ice prevailed throughout the entire extent of the Muir Crest, as is shown by the low "ice lines" in all its canyons and by its numerous unglaciated summits and spurs. This state of things, which must have contrasted with the superabundance of glacial ice in the upper San Joaquin and upper Tuolumne basins, was due in part to the position of the Muir Crest close to the southern limit of glaciation in the Sierra Nevada, which coincides approximately with the southern limit of the High Sierra, properly speaking; and in part, also, to the fact that the Muir Crest was then, as now, robbed of its rightful share of snow by the Great Western Divide, upon which the snow clouds, driven up by southwesterly winds, unload the bulk of their white burden.

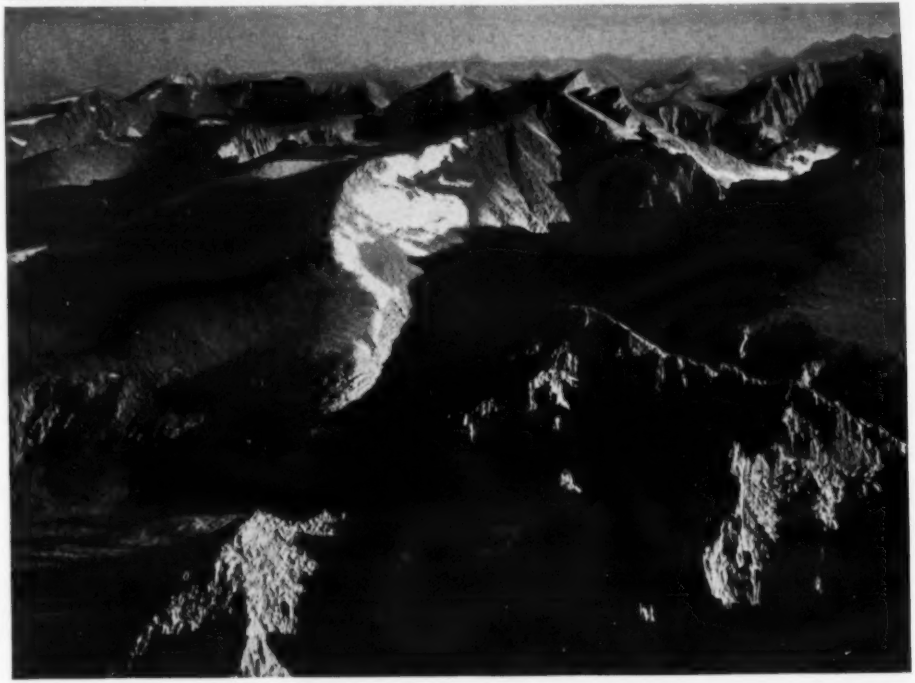
The sides of Mount Whitney, in so far as they rise above the level of the ancient glaciers, are furrowed by parallel or converging gullies, as much as 50 or even 100 feet in depth. Where these are

LOOKING TOWARD MOUNT RUSSELL AND MOUNT WHITNEY

By Henry E. Timby

WESTERLY VIEW FROM THE MOUNT WHITNEY TRAIL.
Mount Hitchcock in the center, Kaweah Peaks in the distance
By Ansel Adams

WESTERLY VIEW FROM THE MOUNT WHITNEY TRAIL
Mount Hitchcock in the center. Kaweah Peaks in the distance
By Ansel Adams



NORTHERLY VIEW FROM MOUNT WHITNEY AT SUNRISE
Toward Mount Barnard and Foresters Pass
By Ansel Adams

AERIAL VIEW OF MOUNT WHITNEY AND THE UPPER KERN BASIN

Table Mountain in the distance

By Roy Curtis, Reno, Nevada

AERIAL VIEW OF MOUNT WHITNEY AND THE UPPER KERN BASIN

Table Mountain in the distance

By Roy Curtis, Reno, Nevada

AERIAL VIEW OF MOUNT WHITNEY AND MOUNT YOUNG

The Kaweah Peaks beyond Kern Canyon

By Roy Curtis, Reno, Nevada

AERIAL VIEW OF MOUNT WHITNEY FROM THE NORTHWEST

Mount Langley in the middle distance

By Roy Curtis, Reno, Nevada

Muir Whitney Russell

AERIAL VIEW OF MOUNT WHITNEY FROM THE NORTHWEST

Mount Langley in the middle distance

By Roy Curtis, Reno, Nevada

Muir Whitney Russell

AERIAL VIEW OF MOUNT WHITNEY AND THE CANYON OF LONE PINE CREEK

By Frank Webb

AERIAL VIEW OF THE MUIR CREST

Lone Pine and the Alabama Hills in the foreground

By Roy Curtis, Reno, Nevada

spaced at close intervals, they are separated only by sharp, craggy rock-ribs, and the cliffs have a distinctly fluted appearance in consequence. These gullies, it is now realized, have been worn, not by streams of water, but by avalanches of snow shod with rocks. They are, indeed, characteristic forms of avalanche sculpture that have not until recently been recognized as such in this country. The bottoms of these gullies are smoothly concave, as a result of the rasping action of frequent avalanches, and remind one of coal chutes such as are used for the unloading of coal cars or coal trucks by gravity. The term "snow chutes" (or perhaps "avalanche chutes") therefore seems appropriate for them.

Snow chutes are numerous on both the north and west sides of Mount Whitney, but those on the west side are developed on the grandest scale. Still more perfect, though perhaps less deep, are the snow chutes on the north side of Mount Hitchcock and in the cirque at the head of Whitney Canyon. The Mount Whitney district is, in fact, remarkably rich in avalanche sculpture, far richer than the Great Western Divide and many other parts of the High Sierra, the principal reason being that its granitic rocks have a fairly regular joint structure. In many alpine regions where avalanches are active in winter, snow chutes are only imperfectly developed or entirely absent, because the rock structure is too irregular.

That the snow chutes in the sides of Mount Whitney were carved chiefly during the ice age, while the canyons were being glaciated, is evident from the fact that they end invariably at or close to the "ice line," which marks the upper limit of glacial corrasion on the canyon walls. Avalanches have occurred, of course, through all of postglacial time and are active in winter even now, but all of this postglacial avalanching has added but little to the depth of the chutes, as is demonstrated by the small size of the rock piles that lie beneath them. These rock piles obviously contain but a small fraction of the total amount of material that has been carved out of the deep chutes.

The snow conditions that prevail on the summit platform of Mount Whitney, and that have prevailed there throughout all glacial times, are intimately related to the development of the snow chutes in its sides. The avalanches are composed today, and doubtless have always been composed, in large part of snow blown from the summit platform by the winter gales. Because of its simple con-

AERIAL VIEW OF THE MUIR CREST
Lone Pine and the Alabama Hills in the foreground
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figuration, unaccidented by ridges, pinnacles, or ravines, that platform is windswept throughout and in every direction. As a consequence the greater part of the snow that falls upon it is blown off by the winds while still in a powdery state. As westerly gales are most prevalent the bulk is flung out to eastward in great "snow banners," such as Muir described many years ago, and swirls down in the "wind shadow" of the peak; but considerable portions of it are blown also in other directions and accumulate in massive cornices at the edges of the platform. It is the breaking down of these overhanging, unstable cornices that gives rise to the avalanches.

Those who have observed Mount Whitney in winter say that its summit is never more than thinly mantled with snow. Sometimes it is even partly bare when the valleys at lower levels are smothered beneath heavy loads of snow. The same is true of all the tabular summits of the Sierra Nevada. What is more, there is good reason to believe that closely similar conditions prevailed on them during glacial times, for the climate then was not more snowy but colder. It is entirely possible, even, that those lofty summits then bore less snow than they bear today, for because of the more intense cold the winter gales were more violent, and the zone of maximum snowfall, which today lies, according to the best data available, fully 3000 to 4000 feet below the level of the main peaks, then probably lay lower still, so that the peaks rose high into regions of relatively scant precipitation.

The summit of Mount Whitney not only has escaped glaciation, but, what may seem more astonishing, it has escaped stream erosion also, during all of glacial, interglacial, and postglacial times. Not a single streamworn gully cuts its surface, nor is there any more than the merest trace of a rainwater rill. The reason is that heavy showers are rare at its high altitude. Even in midsummer the precipitation consists in large part of snow pellets—*graupel* is the technical term—and the snowdrifts waste away chiefly by direct evaporation under the intense radiant heat of the sun, as is attested by their deeply pitted surfaces. They emit meltwater only in drops and driblets, not in streams capable of significant erosion.

The small amount of meltwater that issues from the snowdrifts, nevertheless, is a source of considerable destructive energy. Congealing night after night in the crevices of the rock, it loosens up the joint blocks and in the course of time splits them into smaller

and smaller fragments. The results are familiar to every mountaineer who has visited any of the tabular summits of the Sierra Nevada. They are all encumbered with frost-riven and frost-heaved blocks that make progress excessively wearisome. This type of intense frost work on unglaciated surfaces at high altitudes (and in high latitudes too) has been termed *nivation*, because it is dependent upon the presence of snowfields and snowdrifts. The top of Mount Whitney, accordingly, is properly described as a nivated summit.

It is a pertinent question at what rate the process of nivation works. How fast, or rather, how slowly is it reducing Mount Whitney in height? No observational data are at hand on which a quantitative estimate may be based, but this much can be said without fear of contradiction, that the nivation process works in general far more slowly than either stream-and-rain erosion or glacial erosion. Much depends on the character of the rock. In thin-bedded or slaty rocks that break up into shingle and small flaky fragments, an auxiliary process known as *solifluction* (literally soil-flow) sets in, that operates to remove the frost-split material. It consists of a sluggish flowlike movement that is particularly active in masses of fine material permeated and lubricated with water, causing them to gravitate down slope in tonguelike bodies that push the coarser shingle up on edge. But in the granitic rocks of the Sierra Nevada, which break up for the most part into large and heavy blocks, or locally into loose sand through which water passes as through a sieve, solifluction is not effective as a transporting agent, and as a consequence the frost-split material remains largely in place. Reduction by nivation there is necessarily very slow.

It happens that the summit of Mount Whitney is composed in large part of a fine-grained, siliceous type of granite known as aplite—the kind of rock which ordinarily occurs only in narrow dikes (veins, as they are commonly but erroneously called). This rock breaks up characteristically into large angular slabs and weathers down to sand far more slowly than the coarse-grained granite roundabout. It follows that on Mount Whitney solifluction is wholly inoperative and nivation works even more slowly than on some of the other tabular peaks of the Sierra Nevada. How slowly, you ask? Perhaps as slowly as three or four feet in 250,000 years, to judge from the rate at which certain dikes of aplite whose glacial history

is definitely known appear to have been reduced by weathering. As the ice age and all of postglacial time together aggregate in round numbers one million years, it would follow that Mount Whitney has suffered a reduction of only 12 or 16 feet since the ice age began. The total reduction which Mount Whitney has suffered by erosion of all kinds since it was a lowland hill, considering the climatic conditions and the vegetational cover that existed in preglacial times, probably amounts to several hundred feet.

Remains the question, how old is Mount Whitney? How many millions of years have elapsed since it was a lowland hill? Again, only a rough estimate is possible, only an indication of the order of magnitude of the interval, based on the data that are now at hand concerning the evolution of the upper Kern Basin and the Muir Crest.

The best method of approach is by evaluating the duration of each of the successive cycles of erosion that have left their impress on the region (see Figure 3). Without going into a full discussion of

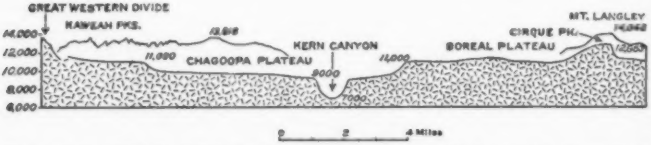

Figure 3—Simplified East-West profile across the upper Kern Basin showing remnants of four erosion ancient erosion surfaces above the Kern Canyon. Vertical scale exaggerated.

all the factors that must be considered, it may be pointed out that the Kern Canyon has been produced by stream and glacial erosion since the last great uplift of the range. It is therefore presumably about one million years old. The broad rock-benches of the Chagoopa cycle, by comparison, must have required 10 to 15 times as long an interval for their development—in round numbers, 10 to 15 million years. The still more maturely developed landscape of the Boreal Plateau cycle, then, may have required fully 20 million years, and at least another five to ten million years is to be assigned to the cycle that followed the initial uplift. The total length of time that has elapsed since the lowland stage, when Whitney Hill was only 1500 feet high, therefore appears to be of the order of 35 to 45 million years.

WILLIAM FREDERIC BADÈ—1871-1936

By William E. Colby

THE year 1903 will always be memorable in the annals of the Sierra Club. It was in June of that year that a young instructor, who had but recently been added to the teaching staff of the Pacific Theological Seminary, joined the Club and applied for membership in its summer outing. The Club was planning what at that time was an ambitious trip for so large a party—a trip to the Kern River Canyon and Mount Whitney. It is difficult for club members of today to realize what an undertaking it was in 1903 for even a small party to visit the headwaters of the Kern. That basin could only be entered in those days from the west, by one or two very steep, rocky, and dangerous trails, which stand out in vivid contrast with the wide easy-grade, boulevard-like trails of today. The trip was one of real pioneering and adventure for the more than two hundred members of the outing party, and no one of that large group enjoyed it more or got more out of it or added more to the pleasure of his fellow-members than the young theologian, William Frederic Badè. He was well-sponsored, for he had as his campmate, Dr. John Knox McLean, the beloved and elderly president of the Pacific Theological Seminary, who had a wealth of mountain experience back of him. He was also a close friend of Warren Olney, who was there with his wife and two daughters. It was in Mr. Olney's law office that the Sierra Club had literally been born, for Mr. Olney had done most of the drafting of its charter and by-laws. Dr. McLean was also a charter member and stanch supporter of the Club, so that Dr. Badè traveled under an aegis that represented the finest and best in the Club's life and activities. It was little wonder, then, that Dr. Badè became such a militant champion of all the principles that the Club stands for. He was by nature an out-of-doors man and reveled in the opportunities for adventure and study afforded by the Kern River outing. After a youth spent in the East, the vastness and majesty of the rugged peaks which rimmed the Kern River basin and the enormous depths of the canyon made a profound impression upon him and easily won him over as a stanch defender of those priceless regions of the

High Sierra. His multifold impressions of that trip were presently set forth in his own delightful way in the *Sierra Club Bulletin*.[1]

It was on this Kern outing that Dr. Badè had his first chance to study the water-ouzel—that saucy sprite of mountain stream made immortal by John Muir's famous "bird biography."[2] A pair were nesting on a ledge behind a waterfall on Coyote Creek, where the Club had its main camp in the Kern River Canyon, and to reach their nest and feed their young the parent birds had to fly through this sheet of crystal which poured down in front of their home. This chance to observe the life habits of an unusual and shy bird made a great appeal to a man of Dr. Badè's instincts and he spent many patient hours watching and photographing these birds; though it must be said these vigils created great consternation among the fair members of the party, for this pool was in the women's portion of the camp area, and afforded an ideal opportunity for bathing. That Dr. Badè's observations were of a high order, both from the standpoint of scientific description and poetic insight as well, is amply proved by the splendid account of these studies which appeared in the *Sierra Club Bulletin*.[3] This intense interest in the natural life about him was one of Dr. Badè's chief characteristics. On subsequent outings, for he went with the Club frequently, unless on some trip abroad, he amazed and delighted everyone with his almost uncanny knowledge of bird and animal habits. Within a few hours after arrival in a new campsite, and with the aid of those also interested whom he would conscript as willing assistants, he would have located every bird's nest in the vicinity and laid plans for photographing the elusive occupants.[4]

As might be expected, he was fond of the flowers, shrubs, and trees, as well, and studied them scientifically. He also had a more than ordinary knowledge of geology and other allied subjects. He was one of the most popular speakers at the campfire gatherings, and many were the nights when he held his audience entranced by his tales of the habits of birds or of his travels in foreign lands. He seemed to have more eyes than the rest of us, and his powers of observation and retention of what he observed were exceptional.

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1 "On the Trail with the Sierra Club," in *S. C. B.*, January 1904, 5:1, pp. 50-65.

2 "The Mountains of California." By John Muir. Chapter 13.

3 *S. C. B.*, June 1904, 5:2, pp. 102-107.

4 "Some Birds of the High Sierra," in *S. C. B.*, January 1912, 8:3, pp. 158-162. "The Mountain Bluebird and the Wood Pewee," in *S. C. B.*, June 1912, 8:4, pp. 260-265.

He would often come into camp with a fungus growth that was new to most of us and proceed to have it cooked and served to a favored few; not, however, without emphatic protests from our faithful Chinese chef, Charley Tuck, who invariably prophesied that the novel diet would "heap killum evlybody." But the partakers all survived, and not without good reason, for Dr. Badè, in his younger days in Pennsylvania, had been a student under Machelvain, the greatest mycologist in America. In this way we were introduced to the edible qualities of the coral mushroom and the sierran puffball. He was also interested in the study of mosses and was a corresponding member of the Sullivant Moss Chapter.

On these outings Dr. Badè seldom mentioned his lifework, and except for the fact that sometimes on a Sunday morning he would hold services in some quiet secluded spot, where those who chose might attend, no one would have suspected him to be one of the outstanding authorities on the study of religion. To appreciate the depth and beauty of his religious thought one should read the beautiful verse which he wrote and which he read on a local Sierra Club walk in the Berkeley hills on Thanksgiving Day, 1921.[5]

He was fond of adventure and sport, and with all his patient observation of birds and flowers he still found time for trout fishing and mountain climbing. On several different years I was accompanied by Dr. Badè on a favorite trip I used to take, starting from Tehama and drifting down the Sacramento River in a scull boat with blind in front, hunting ducks and geese and studying the wild life. Those were exciting and adventuresome days filled with novel experiences, and it gave me the very best of opportunities to know the real Dr. Badè—his fine comradeship, his even temper, his unfailing humor, and his catholic and sympathetic views of life and people. The gorgeous curtains of grapevines in rich autumn coloring festooned from giant sycamores and oaks hanging into the very waters of the river, violent storms that threatened to blow down our little tent at night and impeded our progress by day, myriads of wild fowl that filled the sky, schools of spawning salmon that crowded the river, the elusive otter and other wild life—all made a profound impression on us, and we both counted them among the rare experiences of life.

It was characteristic of him to have joined a party on the 1904

[5] "An Outdoor Litany," in *S. C. B.*, 1922, 11:3, p. 270.

outing which knapsacked down the great and, at that time, seldom traveled canyon of the Tuolumne, and from the Tuolumne Meadows to Hetch Hetchy Valley. All of the knapsackers came into the camp of the main party, which by that time had been established in Hetch Hetchy, literally in rags and tatters. This wear and tear suffered from the rocks and brush of the gorge must have been particularly disconcerting to Dr. Badè, because he had the reputation of being dressed most immaculately for a mountaineer. He has described this rough pioneering trip in the *Sierra Club Bulletin*.[6]

I have narrated the foregoing incidents to bring out the fact that Dr. Badè entered enthusiastically and actively into the life of the Sierra Club from his first contact with it. The Club represented everything that he himself stood for—love of nature, teaching others the value of the out-of-doors, and, above all, crusading so that these priceless gifts might not be destroyed or mutilated. John Muir was still the great living source of inspiration in such matters, and Dr. Badè very naturally gravitated into his sphere of influence and formed a friendship which, strong at first, became increasingly greater. His appreciation of John Muir's life work is expressed in the article he wrote for the *Sierra Club Bulletin* entitled "To Higher Sierras."[7]

I can enumerate only a few of Dr. Badè's activities in the Sierra Club. In 1907 he became a director of the Sierra Club, an office in which he continued for the rest of his life. After several years in which he showed his interest in the *Sierra Club Bulletin* by contributing articles and conducting its book-review section, he was appointed Editor. From 1910 to 1922 he served the Club in this capacity and was largely responsible for bringing this publication to the high standard of excellence which it still enjoys. In May, 1919, he was elected President of the Club, which office he held for three years, presiding with dignity and rare ability. He early became a champion of the causes which the Club sponsored. He was particularly prominent in the fight to preserve Hetch Hetchy Valley and took more than one trip east to present the Club's viewpoint, with telling effect upon members of Congress and in strengthening the support of other outdoor organizations. He could always be relied upon when the best interests of our national parks were

[6] *S. C. B.*, June 1905, 5:4, pp. 287-296.
[7] *S. C. B.*, 1916, 10:1, pp. 38-40.

jeopardized, and both wrote and spoke so effectively that his services were in great demand in time of need. His intimate knowledge of the mountains and all that pertained to them made him an exceptionally valuable and militant disciple of John Muir "in combating the works of Satan," as Muir used to express it.

It is little wonder that on John Muir's death, his daughters selected Dr. Badè to act as literary executor of the numerous note books and unpublished writings which Muir had left, some in fairly complete form. As a result of his editorship the following volumes were published: "A Thousand-Mile Walk to the Gulf," (1916); "The Cruise of the Corwin," (1917); "Steep Trails," (1918). He also wrote the preface for "Travels in Alaska," a posthumous volume edited by Marion Randall Parsons, 1915. The crowning achievement of his literary executorship, however, was the publication, in 1923-24, of the two volumes of "The Life and Letters of John Muir." I wonder whether we fully realize how fortunate we are that to Dr. Badè should have fallen the task of writing this biography and editing these letters. John Muir, from his early boyhood, knew the Bible from cover to cover and could repeat most of it word for word. He was particularly fond of the poetic passages of the prophets of the Old Testament. This is evidenced by his continuous use of those stirring metaphors and allusions in his own writings. Muir saw the countenance and manifestation of a living God in all of the wonderful landscapes that he beheld in his world wanderings. How appropriate then that such a thorough student and admirer of the Old Testament as was Dr. Badé should have edited the writings of Muir, which reflected its inspiring language to such a marked degree!

No one who was not in close contact with what went on behind the scenes can begin to grasp the prodigious amount of labor and thought which went into these volumes. Dr. Badè was unusually thorough in all that he did, in fact he was so determined to gather all the available material on a subject before he started to present it that some would be inclined to think him meticulous. If that be a fault it is one that others might well commit with profit. In any event, Dr. Badé turned into a veritable Sherlock Holmes and ran down clues of every available sort until he had amassed either the originals or at least copies of most of Muir's voluminous correspondence. He even discovered, in a garret in an old house in

Indiana where John Muir once stayed, his long since forgotten botanical specimens collected on an early trip through Canada. From the dates and notations on these specimens, Dr. Badè was able to fill in a period of Muir's life which was otherwise not covered with sufficient data. This biography will always be one of Dr. Badè's outstanding monuments.

Dr. Badè, like John Muir, was born to be a rover, and it was not long after he became interested in the Sierra Club that he began to travel during his vacations. His articles in the *Sierra Club Bulletin*, "An Ascent of the Matterhorn" (January 1907, 6:2, pp. 75-86) and "Haleakala and Kilauea" (1922, 11:3, pp. 231-243) are accounts of two trips widely separated in point of time, as well as in geography.

Thus far I have not touched upon the most important phase of Dr. Badè's life, thinking that the members of the Sierra Club would be primarily interested in his contacts with the Club. It might be well at this point to turn back for a moment to his boyhood and his antecedents. William Frederic Badè was born in Carver, Minnesota, January 22, 1871. His parents were William Bruns Badè and Anna Voigt Badè, Moravian emigrants from Germany. His boyhood was spent on a farm in Minnesota. He early gave evidence of the fire that was burning within him, and, Lincoln-like, devoted his spare time to reading and the acquisition of knowledge. Learning of this insatiable thirst, the president of the Moravian College, at Bethlehem, Pennsylvania, offered him the opportunity to be educated there. Following his graduation he spent a year at Yale University, and then taught for a few years at Moravian College before accepting the invitation from the Pacific Theological Seminary at Berkeley, California, to take the chair of Old Testament Literature and Semitic Languages. With the latter institution (the name of which was later changed to the Pacific School of Religion) he was connected in one or more capacities until his death in Berkeley, at his home, March 4, 1936. To tell of all his achievements in his chosen field and of the honors conferred upon him both here and abroad would fill so much space that it seems best to include them in a condensed chronology following this article.

Dr. Badè's teaching was alive with inspirational enthusiasm. Many of his students brought to the school orthodox beliefs inherited from ultra-conservative sources and he delighted in causing "the

bark to crack," as he humorously expressed it, and in seeing their ideas broaden and develop under his convincing tutelage. Ministers were occasionally shocked at the liberality of his teachings, but his grounding and the enthusiasm which comes with conviction of truth were invariably too much for his critics, who, if they were reckless enough to cross swords with him, retired confounded, if not convinced. In 1915, as the result of his years of research and constant study, he published a volume entitled "The Old Testament in the Light of Today." This met with instant response, and from recognized authorities in many parts of the world came expressions of emphatic approval. I well remember the great satisfaction Dr. Badè expressed when Theodore Roosevelt took the time to write and tell him how deeply gratifying and stimulating he had found the work.

Instead of resting content with his well-earned laurels in the field of letters Dr. Badè, in 1925, entered upon what was perhaps the outstanding achievement of a career filled with extraordinary accomplishments. He had long been vitally interested in archæological research, especially that carried on in Palestine. Convinced that he could successfully conduct such work of exploration himself, he not only imbued some of his generous friends with like faith, but contributed largely to the financing of the undertaking from his own means. With almost prophetic foresight he selected for this work the site of the biblical city of Mizpah of Benjamin—known today as Tell en-Nasbeh. There was great difference of opinion among Old Testament scholars as to the true location of this fortified city. The site selected by Dr. Badè was about seven miles north of Jerusalem. He was aided in this selection by airplane photographs, which disclosed evidence of ancient fortification walls not readily identifiable by inspection on the ground. The first year he uncovered a portion of the city wall, later completing the entire circuit of the wall and bringing to view the imposing gateway where the elders sat in judgment. Very soon he had indisputable evidence that he was excavating on the site of the real Mizpah. During this ten-year period (1925-1935) he made five separate expeditions and carried the excavation to a successful completion. Never was a job done more thoroughly nor the knowledge gained more systematically and scientifically recorded. Temples, humble homes, and tombs were uncovered with equal skill. Rare and beautiful artifacts, including

pottery jars and other utensils, many in fragments later pieced together by skilful hands, were brought to light in great quantities. Much of this material, under the concession agreement, had to remain with the government in Jerusalem, but a large part of the remarkable findings was brought back to the Pacific School of Religion in Berkeley. There it remains, a priceless possession of the Palestine Institute which he founded in the hope that others would carry on his work and eventually erect an appropriate museum to house these treasures.

Dr. Badè had become not only a world authority on Old Testament literature, but also a leading authority on the difficult and delicate work of archæological exploration. He published many articles and one rather complete report on his excavations and, in 1934, "A Manual of Excavation in the Near East." The latter contains a veritable mine of information and advice on the technique of excavation of sites of ancient cities — the mature results of his own years of successful exploration.

This account would not be complete without some mention of Dr. Badè's home life, for it is of special interest to members of the Sierra Club. In 1906 he married Evelyn Marianne Ratcliff, whom he had met on a Sierra Club outing and who, like him, was fond of mountain climbing and outdoor life. Her death occurred the following year, but there survives a daughter, now married—Evelyn Mary Gulick. In 1917 he married Elizabeth Le Breton Marston, also a member of the Sierra Club, whom he had met on its outings and who was and is a great lover of mountain and out-of-door life. There are two children of this marriage, Elizabeth Le Breton and William George. It would be difficult to find a more devoted and thoughtful husband and father than Dr. Badè. He carried into his home his earnestness and sincere devotion to whatever he undertook, and behind that veil which serves to separate each family from the rest of the world, there was enacted a life of rare felicity that might well serve as a model.

It was also characteristic of Dr. Badè that he should have selected a remarkable country place where he might retire on week-ends and during vacations and, in the peace and quiet of woodland surroundings, write the many manuscripts that came from his seemingly inexhaustible pen. The wooded tract of 160 acres, lying on the slopes of Howell Mountain, in Napa County, he and Mrs. Badè named

"Labrusca," the Latin name for the wild grape which grows there and turns such a beautiful gold and crimson in the autumn. It was not long before he had catalogued the wealth of flowers, shrubs, trees, birds, and animals which inhabit this wilderness area, and they continued to be a never-ending source of interest and study. The acquisition of this place was but another expression of his great love for Nature and his desire to spend as many of his days as possible in her intimate and immediate presence. In this and in many other respects he resembled John Muir to an extraordinary degree. To him, as to Muir, religion was found speaking through the voice of Nature.

In the passing of Dr. Badè the Sierra Club has lost a tireless champion—a man who was not content to excel in one field alone, but who mastered and became an authority on many difficult subjects, exhibiting a versatility and at the same time a thorough grasp of each that made him outstanding in intellectual attainment, and with it all possessing a simplicity and personal charm which won him friends and admirers wherever he went in his world-wide journeyings.

CHRONOLOGY

1871. Born at Carver, Minnesota, January 22.
1892. M. A., Moravian College.
1894. B. D., Moravian Theological Seminary.
1894. Ordained at Moravian Church, Bethlehem, Pa.
1895. B. D., Yale Divinity School.
1896–1898. Instructor in Greek and German, Moravian College.
1898. Ph. D., Moravian College.
1898–1902. Professor of Hebrew and Old Testament Literature, Moravian Theological Seminary.
1899–1900. Editor of "The Moravian," official organ of the Moravian denomination in America.
1900–1902. Member of the Pennsylvania Chautauqua Faculty, in charge of Botanical Department.
1901. Studied at Lehigh University.
1902–1936. Professor of Old Testament Literature and Semitic Languages, Pacific Theological Seminary (name changed later to Pacific School of Religion), Berkeley, California.
1905. Studied at University of Berlin.
1905–1910. Editor of book reviews, *Sierra Club Bulletin*.
1907. Dean of the Federated Summer School of Theology, Berkeley.
1907–1936. Member of Board of Directors of Sierra Club.
1910–1922. Editor of the *Sierra Club Bulletin* (Volume 8, No. 1, to Volume 11, No. 3).

1915. "The Old Testament in the Light of Today," Houghton Mifflin Company.
1915–1917. California State Chairman of the Commission for Relief in Belgium and Northern France.
1916. Editor—"A Thousand-Mile Walk to the Gulf," by John Muir.
1917. Editor—"The Cruise of the Corwin," by John Muir.
1918. Editor—"Steep Trails," by John Muir.
1918–1931. Trustee of Mills College.
1919–1922. President of the Sierra Club.
1920–1922. Acting President of the Pacific School of Religion.
1922–1928. Dean of the Pacific School of Religion.
1922. D. D., Pomona College.
1923–1924. "The Life and Letters of John Muir," Houghton Mifflin Company.
1925. Litt. D., Mills College.
1926–1936. Director of the Palestine Institute of Pacific School of Religion.
1929–1936. Member of the Managing Board, American School of Research, Santa Fé, New Mexico.
1929. President of the Society for Biblical Literature and Exegisis.
1931. Lecturer at the universities of Göttingen and Vienna.
1934. "A Manual of Excavation in the Near East," University of California Press.
1934. D. D., Glasgow University.
1936. Died at his home in Berkeley, March 4.

Dr. Badè was also, at one time or another, President of the California Associated Societies for the Preservation of Wild Life, Vice President of the American Alpine Club, Honorary Secretary of the Egypt Exploration Fund, a Fellow of the American Geographical Society, an Associate of the American Ornithological Union, a Corresponding Member of the Anthropological Society of Vienna, a Corresponding Member of the Sullivant Moss Chapter, and a member of the American Philological Association, the Archæological Institute of America, the National Institute of Social Sciences, the California Academy of Sciences, the Society of Biblical Literature and Exegisis, Kosmos Club, the Cooper Ornithological Club, the Agricultural Institute of America and the American Association for the Advancement of Science.

CLIMBS IN THE WADDINGTON REGION—1936

By Hervey Voge

IN 1935 a strong Sierra Club party attacked Mount Waddington in the Coast Range of British Columbia.[1] Bad weather caused defeat, but plans were immediately drawn up for another attempt the following summer. It was hoped that not only Waddington but also some of the other fine peaks in the region might be climbed. During the spring of 1936 the plans for a new trip were completed, and a combined expedition of the Sierra Club and the British Columbia Mountaineering Club was arranged under joint leadership of Bestor Robinson and William Dobson. Supplies were assembled in Vancouver, where most of the work was done by Roy Howard and Clifford Fripp, of the northern club, and on July 1 the advance party sailed on the small diesel-yacht *Tranquilla*.

It was the task of the advance party to pack 1200 pounds of food and equipment up the Franklin River and Glacier so that all would be ready for climbing when the second group came ten days later.[2] We six members of the advance party set about this task immediately upon landing at the head of Knight Inlet after the 30-hour boat trip from Vancouver. We continued to toil through ten days of rain, and were still at work when the second group comprising seven climbers landed on July 13. Although the latter arrived on a day of heavy rain, they brought good weather with them, and the whole group marched to Icefall Point under clearing skies on the two following days. During this march we were granted a splendid view of the mountain. High above the clouds which draped the lower reaches rose the awful spire of Waddington, silvered with ice, piercing the sky, incomparably white, isolated, ethereal. It was a sight both enthralling and terrifying.

A veritable flower-garden flourished at Icefall Point. Among the blossoms we established the base camp, and made ready to attack the nearby peaks. Beside us, in friendly proximity, were camped

[1] "Mount Waddington—1935," by Bestor Robinson, in *S. C. B.*, 1936, 21:1, pp. 1-11.

[2] The advance party comprised Jack Riegelhuth, Kenneth Adam, Hervey Voge, of the Sierra Club; William Taylor, of the B. C. Mountaineering Club, as botanist and cook; and Kenneth Austin, Denver Gillen, Donald Baker, of Vancouver, as packers. Baker went out when the second group came in. The second party comprised Bestor Robinson, Richard M. Leonard, Raffi Bedayan, of the Sierra Club; William Dobson, James Irving, Elliot Henderson, of the B. C. Mountaineering Club; Lawrence Grassi, of the Alpine Club of Canada; and Arthur Mayse, a reporter, representing the "Vancouver Province."

the members of a rival climbing party: Fritz Wiessner, William House, Elizabeth Woolsey, and Alanson Willcox. They also had Mount Waddington as their goal, yet as a matter of courtesy they granted us first chance at the mountain. Our friendly relations with them, typified by many tea parties and long discussions, constituted one of the great pleasures of the trip. Would that all competition could be characterized by such fellowship.

The fine weather continued in spite of many bad signs. On July 17 a camp of nine men was established on the lower level of the Dais Glacier at about 7500 feet. We were ready to attack Mount Waddington from this camp on the 18th, but when dawn showed ominous clouds, plans were abandoned. However, Jack Riegelhuth, Kenneth Adam, and I decided to take our chances with the weather, and accordingly set out for Mount Jester, a nearby 9000-foot peak.[3] While the clouds evaporated we traversed a ridge of decaying rock from the east, crossed the virgin summit, and descended on the west. Though it was not a major climb, it served as an introduction to conditions in the region, and in addition partly salvaged an otherwise wasted day.

The following morning was clear but all too warm. Eight of us left camp at 2:45 A.M. and worked up through the crevasses of the Dais Icefall. The snow was very soft and as our duralumin snowshoes had unwisely been left in camp much time and energy were expended in breaking trail. It was eight o'clock when we reached the smooth slopes of the upper Dais Glacier and stopped to organize climbing parties and to examine the cliffs of the 2400-foot southwest face directly above. The lateness of the hour worried us considerably; in addition, thick mists were now blowing around the peak. However we could at least come to grips with the rock and try out a few routes. After nervously masticating a little food, we roped up in three parties.

Bill Dobson, Lawrence Grassi, and Jim Irving crossed the bergschrund beside the small central gully directly beneath the summit ("Fizzle Chute") and tackled the face to their left. They worked up the difficult rock for 800 feet or so; then turned back because of lack of time, and went on down to camp, where they arrived at about 9 P.M. Their route seemed a possible one, but was long and

[3] Names, elevations, and distances are from Munday's map (*Canadian Alpine Journal*, 1933, Vol. 22, opposite p. 52) and from barometric readings.

AERIAL VIEW OF TABLE MOUNTAIN
Beyond lies the head of the Kern Basin
By Frank Webb

THE NIVATED SUMMIT OF TABLE MOUNTAIN
By Lewis F. Clark

By Lewis F. Clark

SUMMIT OF TABLE MOUNTAIN
Milestone Peak in left center
By Lewis F. Clark

SIERRA SKYLINE

By Henry E. Timby

MOUNT BELL
Coast Range, British Columbia
By Hervey Voge

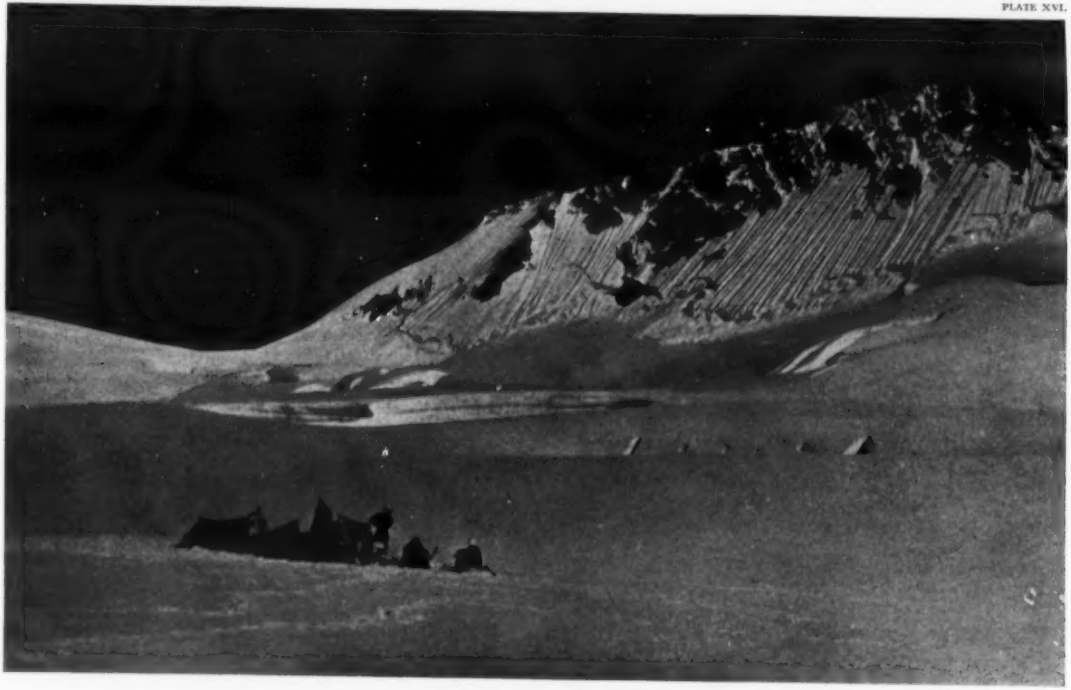
SIERRA SKYLINE
By Henry E. Tinsby

SUNSET AT MOUNT BELL BASE CAMP

By Hervey Voge

SUNSET AT MOUNT BELL BASE CAMP

By Hervey Voge



MOUNT JESTER AND THE LOWER DAIS CAMP

By Hervey Voge

LOOKING NORTHWEST TOWARDS MOUNT BELL, FROM UPPER DAIS GLACIER

By Hervey Voge

slow. Another way that appeared promising was seen in a disconnected series of snow ledges running up from the south arête. Bestor Robinson, Dick Leonard, Jack Riegelhuth, Ken Adam, and I, on two ropes, set out to try this route. We crossed the schrund at the cone below the center couloir (which heads between the summit-tower and the tooth-like southeast peak), traversed the snow slope to the first prominent gully on our right, and went up this gully to a notch in the jagged south arête. Then, staying always on the west side of the arête, we climbed upwards over rock and snow, rejoicing the while to see the mists dissolving. But we were soon involved in a maze of gullies, chutes, and buttresses, and the going became increasingly difficult. The snow softened under the blaze of the sun; the rock was more rotten higher up. Yet in spite of these things we found the climbing immensely exhilarating. It was a spiritual pleasure to be up on the mighty peak, and the continuous sense of exposure, due to the great depths and steep smooth slabs below, acted as a stimulus to consciousness. Everywhere the rock rose in perfect arcs, soaring aloft to the overhanging towers above. On all sides was displayed the tremendous strength of the mountain, a strength which we felt reflected in us by our successful progress.

But we were a long way from the top. At 5:30 P.M. we were about 1400 feet south of the summit and nearly 1000 vertical feet below it. There was no hope of reaching the top that night. We started down, reached the upper level of the glacier at 11:30, and bivouacked there for the night.

It was apparent that the attack should be made from a camp on the upper glacier. On the 21st we packed tents and supplies for six men to a campsite at 10,700 feet. The snow was hard, and we made the ascent in three and a half hours, compared to the five hours required on the 19th. Leonard and Irving were having trouble with their knees and went back to the lower camp after bringing up loads; with them went Adam, voluntarily categorized a packer. The rest of us made ourselves comfortable in camp—Bestor went so far as to dig a commodious ice-cave, a fine shelter for sleep and meals.

At 4 A.M. on the 22nd, Robinson, Dobson, Grassi, Riegelhuth, Raffi Bedayan, and I set out once more on the long diagonal ascent from the south arête. We passed our previous high point at ten o'clock and went several hundred feet higher, to the base of a

LOOKING NORTHWEST TOWARDS MOUNT BELL, FROM UPPER DAIS GLACIER
By Hervey Voge

prominent spire. Deep, vertical-walled gullies cut us off on both sides. Further progress would have necessitated a long rope-down, a traverse of steep snow-covered ledges, and difficult rock-work. The snow was rapidly softening under a warm sun, while large billowy clouds were forming in the valleys below. We decided that advance would involve too great a risk. At 11:30 the descent commenced, and at 6 P.M. we were back in the high camp.

Meanwhile Fritz Wiessner and Bill House had successfully completed the first ascent of Mount Waddington. While we were making our first assault they were placing a camp on the upper Dais Glacier. On the 20th they climbed high up the main couloir which comes down from the gap between the northwest snow-peak and the rock-peak, but when they tried to get out of the couloir onto the southwest face they encountered steep icy rock which turned them back. The next day they had better luck. Starting from camp at 2:45 A.M. they went up the center couloir, mounted rapidly on firm snow and ice, turned left at the first branch, followed a snow ledge out around a buttress, and thus reached a large central snow-patch. Their route then took them upward over steep rock and snow to the foot of a difficult chimney leading to the northwest ridge of the summit tower. They had almost reached this point at the time we were pitching our camp on the upper Dais at 10 A.M., but from then on their progress was very slow. We could see and hear them occasionally; finally we lost sight of them altogether. The rest of the story was told us on the evening of the succeeding day.

In the neighborhood of the chimney they had difficult climbing, particularly because of the looseness of the rock. Pitons were used for belays. When part way up the chimney they traversed out to the south and worked diagonally upward toward the snow-plastered summit. At about four o'clock they stepped out upon the crest, 13,260 feet above the sea, and Mount Waddington had at last been conquered. They did not linger on top, but retreated as rapidly as possible, roping down over the more difficult sections. They were back in their little tent at 1 A.M., a few hours before we started our second attempt.

Behind this brilliant success of Wiessner and House lay a number of important factors; namely, the wide experience and unquestioned ability of the leader, the speed and relative safety from falling rock possible in a two-man party, their willingness to chance

the objective dangers, and the good condition of the mountain and weather. We were filled with admiration of their strategic ascent.

We now debated the possibility of finding another route up the mountain. But on the 23rd the weather was threatening and some snow fell. Furthermore, food was running low in the high camp. Four of us descended to the lower Dais camp, while Dobson and Grassi remained, hoping to repeat the climb of Wiessner and House if the weather should improve. However more snow on the 24th drove them down, and we all congregated at the lower camp.

Six tents were lined up on the level glacier; the camp had the appearance of a boom town in the Yukon. We lay about during the snowstorm and listened to Kenneth Austin, Denver Gillen, and Elliot Henderson tell of their recent first ascent of Mount Vigilant. They had climbed the 9800-foot peak from the south, after a long and circuitous approach over the much-crevassed Dauntless Glacier. Another activity was the determination of plans for the future. The storm had rendered immediate further attacks on Waddington foolhardy, for it had left the cliffs powdered with snow. We therefore turned our attention in other directions. Dick Leonard, Jack Riegelhuth, and Ken Adam wanted to explore the ridge close at hand; and, indeed, on the following day they made a second ascent of Mount Cavalier, 9000 feet, and a first of a grand little rock-peak, Mount Halberdier, 8800 feet. Others planned to visit the snow summit of Waddington, while a third group of us looked farther afield.

Often when climbing on Waddington we had gazed westward to examine the unclimbed pyramid of Mount Bell, and we had resolved to climb it if opportunity should arise. Now, Robinson, Austin, Bedayan, and I chose Mount Bell as our goal. The mountain had never been explored at close range; Don Munday's sortie in that direction having stopped far short of the peak proper. Distant views showed a steep snow-ridge on the northeast, which we hoped to climb. On the 25th, in accord with this hope, we four packed across the snow-blanketed upper Franklin Glacier and up the Portal Glacier to a pass overlooking the Bell Glacier, where we laid down our Bell camp.

A long serrated ridge, broken only in the pass where we camped, runs southeastward from Mount Bell and separates the Bell Glacier on the north from the Portal and Dorothy glaciers on the south.

The Bell and Dorothy glaciers drain westward into the Klinaklini River, while the Portal flows eastward into the Franklin Glacier, joining the latter where the Fury Glacier comes in from the north and the Dais descends from the east. As we stood in our pass we marveled at the contrast between the smooth level stretches of the Portal Glacier up which we had just come and the steep icefall leading down to the Bell Glacier thousands of feet below in its canyon. The contrast marks the transition from the wet, heavily glaciated regions on the southwest side of the range to the more arid country on the northeast. But we were more interested in climbing than in meteorological observations, and soon picked out a route leading toward Mount Bell along the northeast side of the serrated ridge. Then we sought the comfort of our cozy camp in a wind-carved hollow beside the pass.

At 4:40 A.M., July 26, we started on the three-mile journey to Mount Bell and began to contour along the steep slopes of the ridge. Our route took us across three outcroppings of rock and the intervening glaciated slopes by way of big schrunds, intricate crevasse-systems, evil looking seracs, deep snow-chutes and steep fluted snow-fields. The sun was warm, causing the avalanche threat to increase and the going to become more difficult. But at 1 P.M. we stood in the amphitheatre below the peak itself. Here, while we ate lunch, Bestor examined his knee, injured by slipping onto a sharp rock some hours before. The cut was a bad one, but not imminently dangerous, and he resolved to continue.

Easy snow-slopes led up to a shoulder on the northeast ridge, where we paused to survey our position. A number of circumstances indicated the advisability of retreat. It was 2:30 P.M., the hardest part of the climb lay ahead, and clouds were forming overhead; furthermore, Bestor's injury was not a trifling one. However, we were keen for the summit and argued in favor of advance. It was already too late to retrace our steps; the line of retreat would have to be past a snowbladed crest guarding the northeast ridge and down the broken rocky slopes of the latter to the Bell Glacier 5000 feet below. There, at timberline, we could bivouac, then return up the glacier to our camp the following day. But that plan could be carried out even after an ascent to the summit. And there was the further hope that a better way back might be evident from the top.

Austin led up the steeply inclined angles of the uprising ridge,

while I followed to kick parallel steps for the benefit of Bestor's stiffening knee. The snow was firm, the climb invigorating. To the left, rock precipices fell off magnificently; to the right, the névé cascaded down out of sight in a giant icefall. Spurred on by the lack of time, we mounted rapidly up the successive steps of the ridge, until at last we came out upon the snow-crowned summit. We stood on top of Mount Bell, 11,750 feet above the nearby fiords, and in a unique position in the Coast Range. There is no higher peak to the north; Bell dominates its surroundings in majestic isolation. But there was little opportunity for exploitation of the view. Admiration of mighty Waddington to the east; comparison of the snowy upper Franklin with the arid regions to the north; examination of the fine peaks round about, including Mount Geddes across the way; exclamation over the deep canyon of the Klinaklini River, half hidden 11,000 feet below in the west—all these had to be confined to a moment. Instead, attention was concentrated on finding the best way back, for we wished to avoid a tedious return up the badly crevassed Bell Glacier. A little reconnaissance showed a ridge on the southwest which appeared to promise rapid descent to the Dorothy Glacier. Once on the glacier we would only have to ascend a 2000-foot icefall to reach a pass leading to the level Portal Glacier at a point but three miles from our camp. We decided to take this route, and a little after 5 P.M. descended from the summit toward the southwest. The upper slopes were so gentle they could be glissaded; then followed a steep snow-gully dropping to the west. This took us down to a saddle on the southwest ridge, where the rock, a metamorphic variety, was more broken, and cradled a long snow-paved couloir leading down the south face toward the Dorothy Glacier. Well roped together, we began the grueling descent of the couloir, glissading, running, kicking steps or climbing down in rapid alternation, until finally the walls widened out and we slid over the bergschrund of a tributary glacier and down to a rock promontory. It was after 9 P.M. and becoming quite dark, so that a bivouac seemed advisable even though the Dorothy Glacier lay more than 1000 feet below. Seating ourselves on a ledge, we prepared to draw the Duprene shelter-sheet over us, thus to while away the midnight hours. Relaxed at last, we could contemplate our surroundings.

Here was the mysterious glacier world, a region cold, remote, vacuous. Dead walls sculptured from gray rock enclosed the scene;

dirty ice filled it. Now and then a stone rattling down into the abyss punctuated the silence. A pallid moon hung in the leaden sky; no living thing was in sight. One by one we pulled our heads under the protecting cover.

At dawn, after consuming the remaining scraps of chocolate, we descended the rest of the way to the Dorothy Glacier. Low clouds hid the peaks and a dismal rain drizzled down. But in spite of fatigue, hunger, injury, and dampness our spirits rose. A thrilling traverse of Mount Bell lay behind; both new country and home were ahead. Bestor bore his pain with Spartan calm, and the rest of us had little to complain of. We rapidly ascended the acclivity leading to the pass, keeping well to the orographic right. There the icefall though steep was not intricate, and we topped it a little after 9 A.M., only to meet a new obstacle in a thick fog which covered glacier and peaks alike. Guided by compass, we marched eastward, thankful for snowshoes that supported us on the soft surface. An hour and a half passed in blind progress, then the mists lifted slightly to reveal a strange apparition. Ahead was a large crevasse; beyond, the glacier appeared to fall off thousands of feet in a tremendous icefall. This topographically irreconcilable vision caused us much concern. Were we completely lost in the clouds? We sat down to ponder. After an hour or so the fog thinned, disclosing a very gentle declevity where the illusory icefall had been. We were exactly on our course and, upon advancing, soon came across our old tracks. Then the adventures were finished; it was only a matter of dogged packing to evacuate the Bell camp, and that night we pitched our last camp on the ice at the junction of the Dais and Franklin glaciers.

On the following day, amid the flowers of Icefall Point, we rejoined the rest of the party, and heard that Dobson, Grassi, Henderson, and Gillen had climbed the northwest snow peak of Waddington on the 26th, the fourth ascent. They had had no time to try the rock peak from that point, but they thought that the north face, which could be reached by a traverse on the steep snow-slopes northeast of the snow peak, offered some possibilities. Indeed, the Neave brothers and Campbell Secord had climbed high on this north face in 1934. Contrariwise, Wiessner had told us that from the summit the northeast slopes looked much more climbable than the north face. Considering these bits of evidence, we felt that a way could probably be forced up the northern side of the peak.

However there was no chance to test these speculations, for our leave was up. The return to the beach began. A march down the glacier in the rain, camp at the snout, and a beautiful day in the verdant forest were soon behind, and on the 31st came the luxurious boat trip back to Vancouver.

The summer had been a full one. The weather was kindly—fair from the 14th to the 23rd. We had met with both failure and success and had reaped a corresponding reward. Most of all, we had come to love the remote and enchanting glacier-world, and many of us began at once to look forward to another visit to the Coast Range of British Columbia.

EQUIPMENT AND TECHNIQUE FOR CAMPING ON SNOW

By Bestor Robinson

Chairman of the Sierra Club Winter Sports Committee

THERE are many successful methods and variations in methods for camping in the snow. No two mountaineers would be expected to agree upon the best procedure or technique. The conclusions of the most experienced can not be considered final, since new materials and new ideas are forcing their entry into this field each year. This article is written, therefore, for the sole purpose of setting forth the equipment and technique which has evolved from ski trips in the Sierra Nevada each winter from 1919 to date, supplemented by summer expeditions onto the glaciers in more northerly latitudes.

Perfection is not claimed. The equipment and technique outlined have, however, proved satisfactory on several thousand miles of ski-touring both above and below timberline—in full gales with temperatures as low as twenty degrees below zero, for periods up to three weeks on deep snow, in blizzards lasting several days, as well as under Nature's gentler moods and her more amiable manners.

For reasons of safety, a ski-touring party should consist of not less than three persons. Accordingly, our tents, cooking equipment, food, ski-repair outfits, and other equipment used in common are based upon this unit. This permits the division of larger parties into smaller groups for side trips and other purposes, without the difficulties of reorganization while in the field. Safe and enjoyable ski-touring, however, requires more than a pack full of food and equipment. First aid must be mastered and avalanche hazards must be understood.[1]

Packsack.—The requirements for a satisfactory ski pack or packsack are far more exacting than for summer use. Weight must be low on the back to aid in preserving balance; the pack must fit snugly to prevent rolling or sliding when swishing around curves; it must be waterproof; and, finally, it must have convenient pockets for maps, ski waxes, and other miscellaneous small gear. The Bergen

[1] The following articles will give the necessary information: "First Aid," by DeWitt H. Smith, M. D., in *American Ski Annual*, 1936; "An Examination of Snow Deposits." Section III. "Avalanches," by Gerald Seligman, in *The British Ski Year Book*, 1934.

rucksack fully meets these requirements. It should be used with a bellyband in order to relieve the shoulders of the strain that is induced by continuous poling. Some find that the conventional frame shifts the weight too far to the rear. For such persons a light substitute consists of two one-eighth inch by five-eighths inch duraluminum bars placed inside the rucksack and extending from a common point at the upper shoulder-strap anchorage to the two lower strap anchorages, respectively. The bars must be slightly bent to avoid chafing the shoulder blades.

Tent.—A tent barely large enough to accommodate three men is used. It should be high enough to permit sitting upright—any additional height merely adds to weight and danger of blowing over

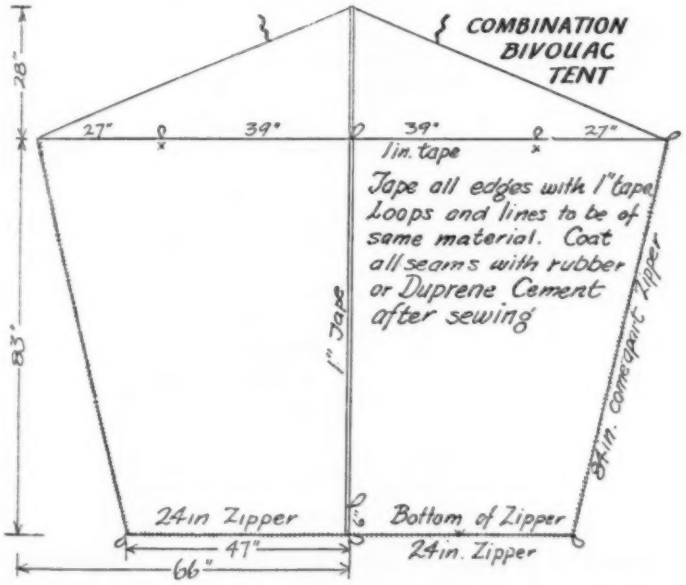


Figure 1

in high winds. Zippers for door and ventilator openings have proved serviceable and have caused no trouble from icing. The front opening is placed a foot above ground-level in order to keep out drifting snow. In high winds ventilation is through the slit at the foot end of

the tent only. The bellows effect induced by the high wind gives plenty of air. In this way snow is kept out of faces.

A sewed-in floor is indispensable, unless one wishes to find his tent carried off by a gale. The floor should be thoroughly permeable, of very light-weight percale or similar material, and without water-proofing or water-repellent treatment. Snow dropping off clothing and boots frequently melts in the tent, cooking pots are sometimes

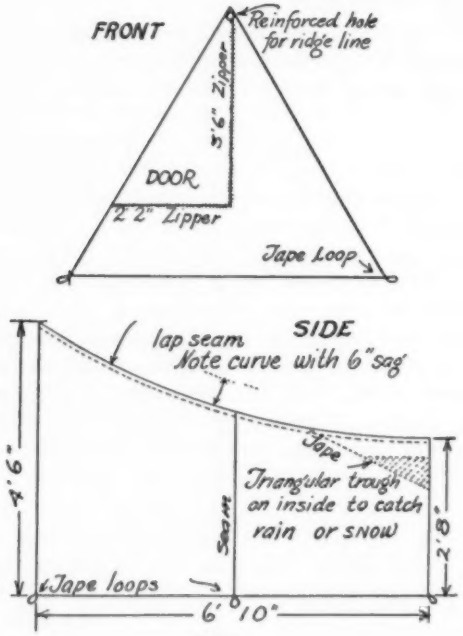


Figure 2

knocked off the primus stove despite the utmost care, and perspiration inevitably condenses on the inside of the tent. It is better to have drainage through the floor and into the snow than into a waterproof sink-hole under hips and shoulders. To keep sleeping-bags dry we use waterproof sleeping-bag covers or ground sheets of one of the types hereafter explained.

Pegs are made of narrow triangular strips of sheet duraluminum

bent into angle sections one foot long. Skis or ski-poles, or duraluminum tube extensions on ice-axes, will serve as end poles. There is no ridge pole, only a ridge line of three-sixteenths inch rope on the inside of the peak of the tent.

In order to prevent tearing the light-weight material of which the tent is made, as well as to enable the tent to sag and spill the wind in a fierce gale, the ridge line is attached to the end pegs by strips of rubber one inch wide. Stumbling and falling headlong onto a tent supported in this manner does not injure it in the least.

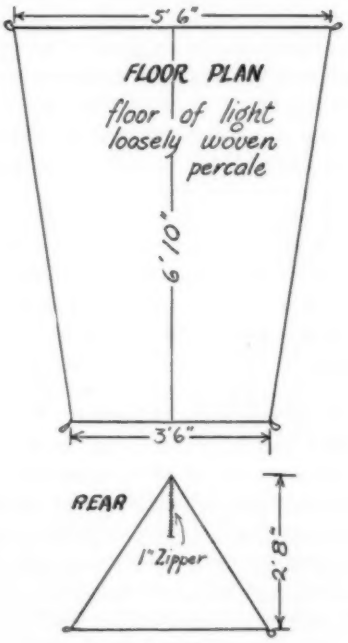


Figure 3

Best of all, such a tent is continuously taut—there are no lines to be tightened during the height of a storm.

Our own ski-touring group is not unanimous as to the character of material best suited for a tent. All are agreed that it should be so thoroughly waterproof that water cannot be blown through it

with mouth pressure or rubbed through it with the thumb. We are likewise greed that the material should not exceed five ounces per square yard in weight and the entire three-man tent should not weigh over three and one-half pounds. There are a number of waterproof silks and cottons that will meet these requirements. Most of our group, after numerous experiments, have come to the conclusion that the ideal tenting material is light-weight silk or cotton coated with Duprene and treated to prevent rot and mildew. The coating has the impermeability, toughness, and elasticity of rubber and, at the same time, does not disintegrate under sunshine or rot or dissolve in contact with petroleum products. Its smoothness causes it to shed snow and prevents the adherence of ice, the latter being a matter of no small importance when it comes to breaking camp and carrying the increased weight of an ice-coated tent.[2]

Instead of the tent and waterproof sheet, a combination bivouac-tent of waterproof material may be used. This contraption, being flat, is much easier to construct than the tent. It weighs, when made of Duprene coated fabric, less than two and three-quarter pounds, yet serves several distinct purposes. As a bivouac sheet, five persons may crouch in the snow facing each other in a circle, throw the sheet over them and sit out a storm, no matter how violent, with complete safety, although hardly with comfort. With all three zippers drawn and the long zipper on top, it can be used as a waterproof covering for three sleeping-bags, either inside the tent previously described, or directly on the snow in pleasant weather. With zippers drawn and the long zipper at the bottom, it may be strung between two ski-poles or ice-axes and serves as a waterproof and stormproof bivouac-tent with waterproof floor. Under such circumstances it will accommodate three persons, but is entirely too crowded to be comfortable. In the forest, however, where a fir-bough floor can be laid on the snow, it can be stretched as a floorless, but commodious, forester's tent, or as a closed-side lean-to. In either event, the front will be open—a desirable feature in a dense forest away from winds, with a fire crackling nearby, but completely useless above timberline.

Sleeping-bag.—We have been able to find but two materials which will give sufficient warmth for camping on the winter snows and still remain within the rigid limitations of weight and bulk necessary for enjoyable ski-touring. They are down and llama wool. A fuzzy-

[2] This material is obtainable from E. I. Du Pont de Nemours & Co., Fairfield, Conn.

surfaced blanket, loosely woven, consisting of one hundred per cent llama wool is, weight for weight, fully as good as a down bag and will stand far more abuse. Two bags of the "mummy case" design shown in the sketch should be used, as a single layer will not give adequate warmth. The mistake should not be made of considering even the best Hudson Bay blanket an adequate substitute. Llama wool has been found to provide nearly twice the insulating power of the best lamb's-wool. Two blanket bags, one inside the other and having a total weight of four pounds, will be found adequate in temperatures of −20° F.

Llama wool blankets of the right sort are expensive and difficult

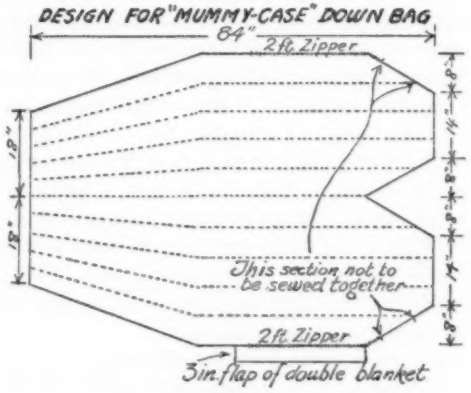


Figure 4

to secure, unless one has a friend traveling in South America. A quilted bag filled with first quality white goose-down is equally efficient—if filled with genuine eiderdown it is more so. In designing such a bag, two basic points should be kept in mind: The first is that the heat loss from radiation and conduction is directly proportional to the area of the bag. In the second place, there is a great deal of heat lost by the bellows action of the bag sucking in cold air around the neck and shoulders. A form-fitting tapered bag covering the entire head, except the face, obviously satisfies both points. The designation of "mummy case" is both descriptive and appropriate.

Following the illustration, the bag should be made of two layers of very light-weight closely woven Egyptian sail-cloth. All seams

and edges, except at the foot, should be sewed together, thus forming ten tubes. A two-and-one-half pound bag of down should be purchased; the blower and suction hose attached to the family vacuum cleaner, placing the suction end in the down bag and the blower end far into one of the tubes, and gradually withdrawing it as the tube is filled. The foot end of the tube must be held tightly around the blower hose, else a splendid imitation of a High Sierra blizzard will ensue. Equal distribution of down between the ten tubes can be secured either by estimate or by continuously weighing the bag of down. After the blowing is completed, the lower ends of the tubes are sewed together, and the quilt folded and edges sewed together, except at the place where the zipper is indicated. A removable lining of light-weight material will add to the cleanliness of the bag. Strange as it may seem, silk is best for this purpose, because of its low coefficient of friction. The bag, complete with lining, should weigh four pounds and will roll into a bundle eight by thirteen inches.

Waterproof Covering.—Although it is satisfactory to equip each bag with an individual waterproof envelope, weight can be saved by using a thoroughly waterproof sheet the same size as the tent groundcloth. This is laid down and fastened to the bottom by light snaps just before turning in. During the preparation of meals it is wrapped around the three sleeping-bags, which are usually piled in the center of the tent and used as a seat.

Food.—If one seeks physical sustenance, and that alone, the U. S. Army emergency ration, or the explorer's ration of pemmican, hardtack, tea, and chocolate powder, can be used, and weight reduced to one and three-quarter pounds or less per man-day. Most of us, however, sufficiently enjoy tastiness and the feeling of a full stomach so that we are willing to go somewhat beyond the bare necessities of existence. The food list which follows is based upon principles which have evolved out of innumerable mealtime arguments:

1. All breakfasts should be identical, all lunches identical, and all suppers identical. This reduces the difficulty of packing and preparation.
2. Dried-fruit supplies sufficient roughage and is a complete substitute for vegetables.
3. Nothing should be fried.
4. An adequate protein supply is necessary to preserve a feeling of energetic well-being.

5. Butter, because of its high digestibility, as well as calorific value, should be used liberally, not only on breadstuffs, but in hot cereal and chocolate.
6. All supplies should be easily procurable.

Our standard menu is:

Breakfast. Stewed fruit; hot cereal, with butter and milk; hot chocolate.

Lunch. Dried fruit; shelled nuts; hard candy; bar chocolate; breadstuffs, with preserved meats or cheese.

Supper. Soup; stewed fruit; hot chocolate, coffee, or tea; mulligan of macaroni, or rice, with meat or cheese.

The following food list is based upon an input of 4230 calories per man-day, which is theoretically equivalent to the mechanical energy required to lift a 200-pound man 65,000 feet into the air. It is a full-belly ration for large men and may be cut one-fourth by those who prefer a little hunger to carrying heavy packs. All foods are packed in light cloth bags, waterproof of course, for such foods as are hygroscopic.

	Pounds per man-day	*Calories per pound*	*Calories for quantity indicated*
Mixed dried fruits	.25	1500	375
Granulated sugar	.30	1750	525
Bar chocolate (semi-sweet)	.20	2500	500
Mixed hard candies	.10	1750	175
Mixed shelled nuts	.15	2500	375
Preserved and dried meats (ham, dried beef, jerky, liverwurst, etc.)	.30	1500	450
Cheese	.10	1900	190
Knorr's soup (⅓ roll)	.08	1500	120
Dried whole-milk	.15	2600	390
Oatmeal or wheat germ	.15	1750	263
Butter	.15	3400	510
Breadstuffs (hard rolls, ryecrisp, hardtack)	.12	1600	192
Supper starches (rice or macaroni)	.10	1650	165
Tea, G. W. coffee, salt	.10	0	0
Total	**2.25**		4230

Mess-gear and Food Preparations.—Two two-quart light aluminum pots suffice for three men. It is possible to get along with one. A cup and spoon apiece is the only additional mess-gear required. If our plans call for camps above timberline, we take one half-pint

primus stove for three men and one-sixth pint of kerosene for each man-day.

Below timberline, fires can be made of squaw wood — the dead limbs hanging under the live branches of conifers. A fire made on top of well-packed snow will last long enough to prepare a meal before sinking out of sight. If desired as a campfire, however, it must be made on a hearth of green poles.

Clothing.—One hundred per cent wool (except for the parka) is the inflexible rule for all clothing. So-called "all wool" is usually only sixty-five per cent wool. Cotton is not only a poor heat insulator, but is hygroscopic. Even when not wet, cotton garments on winter trips are usually damp and clammy. Individual preferences vary. There follows, however, our usual clothing list, including "on the back" as well as "in the sack."

Sox—three complete changes.
Ski-boots and ski-cap.
Ski-pants of smooth-finish windproof type.
Two polo-shirts.
One or two light slip-on sweaters.
Wool underdrawers—short or long, depending on weather anticipated.
Waterproof parka, loosely fitting to allow adequate ventilation.
Two pairs of knitted mitts; one pair of waterproof mitt-covers.
Two bandanas, cotton.

It is not indispensable, but very desirable, to treat all-wool clothes with a water repellent. Even knitted goods after such treatment will shed water and will not get as damp as otherwise from perspiration. For these reasons "trockenwolle" or dry-wool has become exceedingly popular in Europe. The usual treatment is to dip in a dilute wax emulsion, such as Aridex, then dry and iron. Instead of wax, the original wool-grease, lanolin, may be impregnated into the wool by dipping in a dilute solution of lanolin and gasoline. In neither case is there any apparent change in texture or appearance of the cloth.

Miscellaneous Gear.—In addition to food and clothing, there are various essential items which must be carried on cross-country touring. The items will vary with the conditions which it is expected will be encountered. The following is our customary list:

Primus stove, if necessary.
Compass.
Extra pair of dark glasses.

First aid kit: roll of two-inch adhesive, sterile gauze, disinfectant, aspirin.
Ski-repair kit: light pliers, small screwdriver, screws and bolts, wire, ski-tip or *flickzeuge*, extra toe-strap.
Ski waxes and scraper.
Thirty feet of three-sixteenth-inch rope, for tent ridge-line and emergency ski-toboggan.
Maps, preferably U. S. G. S. topographical sheets.
Matches, in waterproof case.
Fire lighting material, such as "meta," if primus stove and kerosene are not carried.
Sunburn cream or ointment.
Toothbrush.
Soap, hotel size.
Jackknife.
Flashlight—the miner's headlight type is best.
Sewing kit.
Thongs.

The temptation to add weight is hard to overcome. Reduction of weight in every possible way that will not affect safety must become a mania. The extra bandana serves as an adequate towel; a tiny hotel-bar of soap will serve also for tooth paste; and, if necessary, half the handle of the toothbrush can be cut off and holes drilled in the remaining half.

With the equipment and clothing listed, including the tent and primus stove, each pack will weigh fifteen to eighteen pounds, plus two and one-quarter pounds for food for each day on the trail.

A CLIMBERS' GUIDE TO THE HIGH SIERRA

INTRODUCTION

BY THE COMMITTEE ON MOUNTAIN RECORDS

THE Sierra Club's Committee on Mountain Records has for several years been engaged in compiling data for a Climbers' Guide to the High Sierra. Much information has been gathered, but a great deal remains to be done before the work can be considered ready for publication in final form. Meanwhile, it seems desirable to place certain well-advanced portions before the members of the Club for such use as may be made of them and for the purpose of bringing forth additional information as well as criticism. It is particularly desirable that all data be carefully examined by those who have special knowledge of the regions, and especially of the peaks, in question.

With certain exceptions, the area to be covered by the Guide is the High Sierra region at the headwaters of the Tuolumne, the Merced, the San Joaquin, the Kings, the Kern, and the Kaweah rivers, together with adjacent portions of the eastern side of the range. The rocks of Yosemite Valley, although lying below the region ordinarily known as the High Sierra, will be included because of their special interest to climbers; also, Mount Shasta, White Mountain, and a few other isolated peaks, for the same reason. Within the natural divisions of the Sierra, as usually conceived, there are distinct groups of peaks which, because of their isolation, or because of their accessibility from a single base, or because of long-standing custom as expressed in their names, may be treated as units. Such, for instance, are the Sawtooth Ridge, the Palisades, the Evolution Group, the Kaweah Peaks.

The plan of the Guide embraces a brief description—topographic and geologic—of each unit, a description of the routes of access, the passes, and the camping areas, and such other information as may be helpful to the climber. For more general information as to trails, roads, and accommodations reference is made to Starr's "Guide to the John Muir Trail and the High Sierra Region." Farquhar's "Place Names of the High Sierra" serves as an index to the historical background. Topographical references are to the maps published by the

U. S. Geological Survey. It is intended to supplement the latter by specially prepared detail-maps and sketches.

The committee has given a great deal of thought to the formulation of a classification of standards of difficulty in climbing. The purpose of this classification is not to promote competiton or to afford a means of grading climbers for public recognition, but, rather, to give each climber an opportunity to judge for himself what climbs he should undertake under varying conditions. A classification is here tentatively advanced, subject to revision after further trial and discussion. It is based upon a conservative estimate of the safety requirements for any climber regardless of experience, and is intended to conform to generally accepted European standards. It is, of course, clear that no one should attempt a climb unless properly equipped and prepared by experience to meet the safety requirements recommended. Adverse weather conditions may seriously increase the difficulties. A knowledge of general mountaineering—as contrasted with technical rock-climbing—sufficient to care for one's self in the region is presumed. In the examples which follow, reference is made to the easiest route of the respective climbs.

1. *Easy.* Rock-climbing experience unnecessary. Examples: Whitney, Alta Peak, Dana, Conness, Clouds Rest.

2. *Moderate.* Ropes should be available on the climb. Examples: Russell, North Palisade, Ritter, Lyell, Clark.

3. *Difficult.* Ropes should be used in all cases—continuous climbing. Examples: Black Kaweah, Middle Palisade, Clyde's Minaret, Half Dome from Mirror Lake.

4. *Very Difficult.* Belays should be used—consecutive climbing. Examples: East face of Whitney, Echo Ridge, Three Teeth.

5. *Severe.* Pitons should be available on the climb. Examples: Washington Column, Panorama Cliff, Lower Cathedral Spire, Higher Cathedral Spire.

6. *Very Severe.* More difficult than fifth class. As yet undefined. Examples: None as yet.

On the more difficult peaks several routes are described. They are numbered according to the order in which they were established, in so far as that is known, although frequently this is not the order of

their difficulty. Brevity in the description of a route is not an indication of simplicity. Only the more fundamental directions are given, leaving to the climber plenty of opportunity for pioneering. If at any time, therefore, the description of a route seems to be inadequate, let the climber consider whether it is not because he himself lacks the experience required to make this particular ascent in safety without a more experienced leader.

Although all of the major peaks and most of the lesser peaks of the High Sierra have been climbed, there remains, nevertheless, a practically inexhaustible field for the discovery of new routes and for the exploration of pinnacles, arêtes, and cliffs. It is the desire of the Committee to gather in the Club's files full descriptions of all new climbs for the benefit of what it is hoped will be successive editions of the "Climbers' Guide."

PART I

THE SAWTOOTH RIDGE

BY RICHARD M. LEONARD

The slender pinnacles and narrow arêtes of the Sawtooth Ridge form a portion of the northeast boundary of Yosemite National Park. The main peaks are shown on the United States Geological Survey map (Bridgeport Quadrangle) and on the map of the Yosemite National Park, but the accompanying sketch map must be consulted for more complete detail and for names not shown on the official maps. Although the peaks are only 11,400 to 12,281 feet in altitude, nevertheless, they constitute one of the most interesting and difficult climbing regions of the High Sierra. The rock is a firm white granite, often of a spiry formation. The northeast face of the ridge is severely undercut by recent glaciation, four small glaciers still remaining. The portion of the climbing that requires the use of the rope averages about 500 feet in height.

The region may be reached from the south by good trail from Tuolumne Meadows to campsites below Whorl Mountain, in Matterhorn Canyon at 9,600 feet, and north of the Finger Peaks, in Slide Canyon, at 10,000 feet elevation. However, the peaks are more accessible from the north, via Bridgeport and Twin Lakes. By a climb from the road of only 3,000 feet in three miles, without trail, a fine campsite can be reached at an altitude of 10,000 feet near a glacial lakelet on the east branch of Blacksmith Creek.

Although Matterhorn Peak was climbed in 1899, all other points seemed too difficult until modern methods of rock climbing were introduced in the summer of 1931. With the application of a new technique all major points have now been ascended. There are, however, several minor summits yet unclimbed, and many fine new routes still to be made.

REFERENCES

Sierra Club Bulletin: 1900, 3:2, pp. 159-163; 1922, 11:3, p. 256; 1932, 17:1, pp. 6, 113, 114; 1933, 18:1, p. 134; 1934, 19:3, pp. 31-33, 98; 1935, 20:1, pp. 39, 46-49, 76, 105, 106.

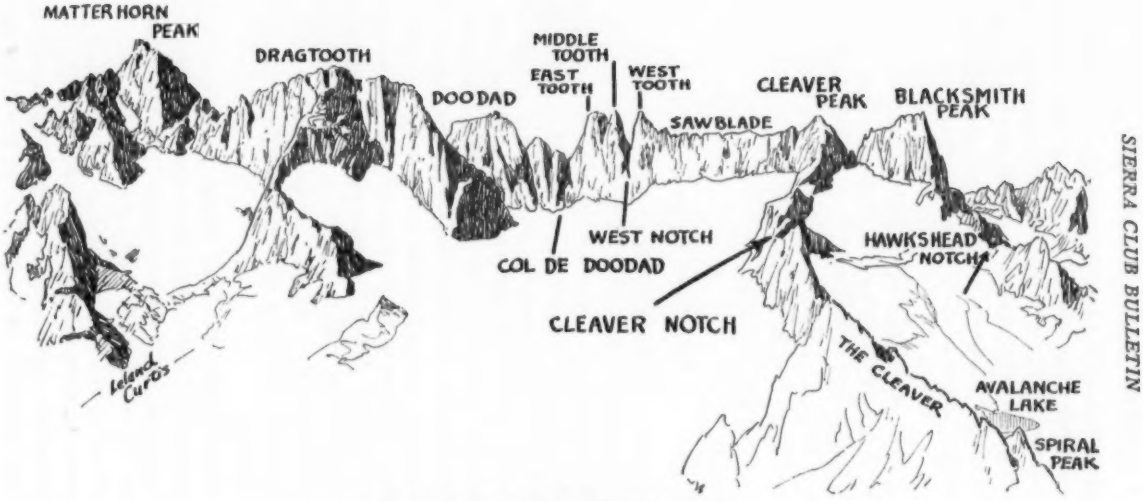
PHOTOGRAPHS

Sierra Club Bulletin: 1900, 3:2, pl. 23; 1934, 19:3, pl. 11; 1935, 20:1, pls. 22, 23.

PRINCIPAL PASSES

Col de Doodad. East Chimney, S. to N. Fourth class; 200-foot reserve rope required, ice-ax useful. This pass was first used July 2, 1933, by Henry Beers, Bestor Robinson, Richard M. Leonard. It is the most convenient route from Slide Canyon to the NE. face of the central portion of the ridge. The approach from Slide Canyon is up easy scree to the lowest and most prominent gap between the Three Teeth and the Doodad. The 45-degree couloir on the N. is usually snow-filled in the upper half and is bare disintegrating granite in the lower parts. From the col, rope down the snow 100 feet to a ledge. Traverse 10 feet horizontally left (NW.) to the head of a dry disintegrating chimney. There a piton has been driven into the headwall on the left (SW.). Rope down 90 feet to a steel spike driven into a crack in the right (NE.) wall at the head of a steep 60-foot drop to the glacier. A third rope-down brings one to the head of the glacier.

———*West Chimney, N. to S.* Third class. From the NE. ascend a moderate 35-degree gully close against the East Tooth. Follow this gully left (SE.) under an overhanging block to the crest of the ridge. Thence, down to the right (SW.) 30 feet over moderately hard climbing to a platform, then to the left (SE.) to an overhanging chockstone at the head of a short steep chimney. Climb down this chimney to the scree gully on the S. side of the Col de Doodad. This route is much easier from N. to S. than the East



SKETCH MAP OF THE SAWTOOTH RIDGE
Drawn by Leland Curtis

Chimney and is somewhat easier from S. to N., but should be attempted in the latter direction only by those experienced in route finding as it is poorly defined from the Slide Canyon side.

Glacier Col. Second class; ice-ax advisable. This pass is located between Cleaver Peak and Blacksmith Peak. The ascent is over moderate scree and benches from Slide Canyon and 40-degree snow and glacier on the N. It is probably the least difficult pass across the Sawtooth Ridge.

Cleaver Notch. Second class. First used July 2, 1933, on the first ascent of the Three Teeth. It is almost the only practical route across the exceedingly sharp arête of the Cleaver. The notch is crossed at its southern edge, only 30 feet above the glacial benches on either side.

Hawk's Head Notch. Fourth class. Although the upper portion of the arête between the two branches of Blacksmith Creek has not yet been crossed, reconnaissance indicates that this notch is about the only practical route across this portion of the arête. The notch is located on the arête about 100 yards N. of Blacksmith Peak just before reaching the sharp minor pinnacle with the overhanging summit known as the Hawk's Head. The E. approach is moderate, but on the W. very difficult crack-climbing is required.

PEAKS

Matterhorn Peak (12,281). *Route 1—South Face.* First class. First ascent, 1899, by M. R. Dempster, J. S. Hutchinson, Lincoln Hutchinson, Charles A. Noble. This peak, the highest point of the Sawtooth Ridge, offers the most extensive view in the region. There is an easy route up the broad scree gully on the center of the S. face.

———*Route 2—Northwest Face.* Third class. First ascent, July 20, 1931, by Walter Brem, Glen Dawson, Jules Eichorn. To the notch between the Dragtooth and Matterhorn Peak; thence up a gully, or by the face, to the summit.

The Dragtooth (12,150). Second class. First ascent, July 20, 1931, by Walter Brem, Glen Dawson, Jules Eichorn. Nearly any portion of the south face will be found practicable.

The Doodad (11,700). Fourth class. First ascent, July 7, 1934, by Kenneth May, Howard Twining. Several routes, varying from

difficult to very difficult, are possible up the S. face to the 25-foot granite cube which forms the summit and which overhangs on all sides. The final climb is up a crack on the SE. corner. September 7, 1936, Carl Jensen made a traverse by descending the more difficult crack on the NW. corner.

The Three Teeth (11,750). *Route 1 — Traverse NW. to SE.* Fourth class; reserve rope required. First ascent, July 2, 1933, by Henry Beers, Bestor Robinson, Richard M. Leonard. ("Three Teeth of Sawtooth Ridge," in *S. C. B.*, 1934, 19:3, pp. 31-33.) The route is up a series of ledges in a broad depression on the center of the NE. face of the West Tooth. About one-third the way up, traverse diagonally upward to the right (SW.) to less difficult ledges leading upward to the Sawblade. Follow the arête back to the left (SE.) to the tunnel beneath the summit block. Climb to the NW. out of the tunnel then up the NW. face of the block to the summit of the West Tooth.

From a point at the SE. end of the tunnel rope down 75 feet towards the Middle Tooth to a 3-foot ledge. Climb downward toward Slide Canyon 100 feet along steeply sloping ledges and cracks. Traverse back (NE.) to the West Notch. Ascend a chimney rising from the notch to the summit of the Middle Tooth. Follow this chimney about 200 feet until easier face climbing appears on the left (NE.). Traverse this face diagonally right (SE.), cross the chimney about 50 feet below the summit, and then by good holds on the face to the right of the chimney climb to the summit of the Middle Tooth.

The route down to the East Notch follows a short chimney near the NE. end of the summit, then steep cracks to the head of the large chimney a short distance below the notch on the Slide Canyon side. Traverse SE. 75 feet along ledges on the Slide Canyon face of the East Tooth to a narrow steep chimney up the face. Climb the chimney to a chockstone then traverse to the right (SE.) a few feet on small holds out of the chimney to a parallel crack. Follow this crack to the summit of the East Tooth.

From the summit follow the Slide Canyon side of the SE. arête down over steep, exposed and very difficult climbing. About half way down this arête a pinnacle about 20 feet high will be encountered. This can be passed by direct attack, roping down a steep

chimney on the opposite (SE.) side to less difficult climbing leading to the Col de Doodad. A better route is to turn right at the Pinnacle and descend the SW. face over progressively easier climbing to the Slide Canyon base of the Middle Tooth.

———*Route 2—Traverse SE. to NW.* Fourth class, with one fifth class pitch. First ascent, July 25, 1934, by Glen Dawson, Jack Riegelhuth. From a short distance below the Col de Doodad, on the Slide Canyon side, ascend the short chimney with the overhanging chockstone leading to the arête and the west chimney of the Col de Doodad. Follow the arête to the base of the tall pinnacle. Pass this on the left by crawling through a remarkable tunnel on the SW., to more difficult climbing leading back to the SE. arête. Thence by Route 1 to the summit of the East Tooth. A more obvious route is from the Slide Canyon base of the Middle Tooth to the tall Pinnacle on the SE. arête of the East Tooth and thence to the summit.

Traverse the Middle Tooth by Route 1, thence to the base of the rope-down on the West Tooth. The angle of the next 75 feet is about 80 degrees, highly exposed. The holds are rather unsound. Protected by pitons, the ascent is made up thin cracks and narrow ledges to the tunnel, thence by Route 1 to the summit of the West Tooth. Route 1 may then be followed to the base on the NE., or various routes hereinafter described may be used for roping down the Slide Canyon face.

———*Route 3—The Middle Tooth From the N.* Fourth class; ice-ax required. First ascent, July 2, 1933, by Lewis F. Clark, Richard G. Johnson, Oliver Kehrlein, Randolph May. From the NE., ascend the steep snow-couloir leading towards the West Notch. One hundred feet above a hanging chockstone leave the snow and traverse diagonally back (NE.) on a ledge on the left (SE.) wall. When snow is low some difficulty may be experienced in getting on the ledge. After traversing the ledge pretty well onto the face, ascend a prominent chimney and ledges upward to the right (SW.) to a point on Route 1 in the chimney rising from the West Notch. Follow Route 1 to the summit.

———*Rope-Down Routes.* Fourth to fifth class; 200-foot reserve rope required. By the use of many pitons nearly any route is probably possible. It is well, however, to mention certain routes that have actually been used. On July 25, 1934, Glen Dawson and

Jack Riegelhuth reached Slide Canyon from the NW. arête of the West Tooth near the junction with the Sawblade by a series of four rope-downs involving the use of one piton. At the same time Doris F. Leonard and Richard M. Leonard roped down from the West Tooth toward the Middle Tooth by Route 1 and thence by three more rope-downs along the SE. buttress to Slide Canyon. The last rope-down, from a piton on a ledge, was 105 feet, most of it overhanging. On July 7, 1934, Kenneth May and Howard Twining worked out a successful route roping down from the Middle Tooth to Slide Canyon by the great SE. chimney from the East Notch. On September 7, 1936, Carl Jensen, Bestor Robinson and Richard M. Leonard roped down from the Middle Tooth to the N. base by roping off from the lower end of the chimney on the NW. face the upper part of which forms a portion of Route 3. About half of the last rope-down is overhanging. On September 8, 1936, John Poindexter and Don Woods roped down the N. face of the East Tooth from the East Notch. The route is very severe, involving the use of pitons and slings to sit in as one of the intermediate stances. The route involves considerable uncertainty and is not recommended.

The Sawblade (11,600.) *Traverse S. to N.* Fourth class; reserve rope useful. First ascent, July 25, 1934, by David R. Brower, Hervey Voge. From Slide Canyon up steep climbing to the notch just W. of the tall pinnacle on the NW. arête of the West Tooth. An attempt to traverse this portion of the Sawblade to the West Tooth was blocked by the pinnacle which could not be turned. Descent was made to the NE.

Cleaver Peak (11,850). *Route 1 — Southwest Face.* Second class. First ascent, July 3, 1933, by Henry Beers, Oliver Kehrlein. From Glacier Col climb on to the SW. face and traverse diagonally upward to the left (N.) to a broad depression on the NW. face. Follow this to the summit.

———*Route 2 — Northeast Face.* Third class. First ascent, July 27, 1934, by Glen Dawson, Jack Riegelhuth. Up a series of ledges and blocks on the NE. face to the arête of The Cleaver 50 feet N. of the summit. Traverse the arête to the summit.

Blacksmith Peak (11,850). *Route 1—Southwest Face.* Second

class. First ascent, July 3, 1933, by Bestor Robinson, Richard M. Leonard. Up a prominent gully on the SW. face to its head among the four summit pinnacles. The highest is on the NW. end. The register is on the flat-topped pinnacle third from the highest.

———*Route 2—The North Gully.* Fifth class; pitons required. First ascent, September 8, 1936, by Bestor Robinson, Carl Jensen. From the base of the N. arête ascend a steeply sloping ledge on the Cleaver Glacier side diagonally upward toward the S. About 200 feet above the talus the ledge ends against a vertical face. Traverse to the right (W.) and protected by several pitons climb about 20 feet of face on small holds to the large north gully. Ascend this gully to its head among the summit pinnacles. On the first ascent the peak was traversed from S. to N. by roping down from the lower end of the north gully.

Eocene Peak (11,555). Second class. First ascent, July 16, 1932, by Herbert B. Blanks, Richard M. Leonard. A ropeless ascent of the SW. slopes of this fragment of the ancient Eocene landscape. The final pinnacle rising 50 feet above the plateau may require ropes for inexperienced climbers.

The Outpost (11,600). Second class. First ascent, September 6, 1936, by Carl Jensen, Bestor Robinson, Florence Robinson, Don Woods. Up easy scree from the SE., or up many different routes on the E. face, varying from moderate to severe.

THE 1936 OUTING

By Louise Hewlett

Probably more free sunshine falls on this majestic range than on any other in the world I've ever seen or heard of. It has the brightest weather, brightest glacier-polished rocks, the greatest abundance of irised spray from its glorious waterfalls, the brightest forests of silver firs and silver pines, more star-shine, moonshine, and perhaps more crystal-shine than any other mountain chain—John Muir.

IS it any wonder we love our mountains! Any wonder the Sierran's heart turns a few extra somersaults as he stuffs the last shirt into a bulging dunnage? There it stands now, sturdy and stanch comrade of many summers, ready to be hoisted into the automobile and whisked away over valleys and foothills to the mountains. Anyone can see that it's only an old canvas bag patched up with bits of denim and adhesive plaster, but to the owner every last scar on that bag is precious. Isn't it his ticket to star-shine, moonshine, and crystal-shine?

All through the afternoon of July 11 the Sierrans and their dunnages and automobiles gathered under the roof of Giant Forest. The sleeping dust took wings and climbed the sunbeams in golden clouds, while jays sped from tree to tree voicing angry opinions, and chipmunks scurried to high retreats, but kept an interested eye on commissary. The antics of these two-legged invaders were certainly peculiar — staggering ant-like under immense bundles, rooting around in the pine needles like dogs looking for a place to sleep, sauntering aimlessly here and there and making a great deal of noise about it, lining up for food like sheep. All very strange! But at least they showed some sense in going to sleep at night and once again it was quiet enough for a fellow to hear himself gnawing a nut.

Like it or not, the jays and squirrels had to put up with us for one more day while we wandered about the lovely old forest, bathed in the river, or stood on the tip of Moro Rock excitedly tracing our next day's route up River Valley. It was tomorrow we were thinking

about and waiting for, tomorrow that the splendid pilgrimage would really begin.

The great day came at last, rudely heralded at four-thirty o'clock by cries of "Everybody get up, get up, get u-u-p!" We groaned and obeyed unhappily. Dunnages to be packed and weighed before breakfast. Oh, fateful moment of weighing-in! Thirty. . . . thirty-three. . . . thirty-five. Stop there! Thirty-six. . . . oh ineluctable! Thirty-seven. . . . inexorable. Unpack, rummage, remove poncho and reweigh. Thirty-five. . . . triumphant!

At Crescent Meadow we scrambled out of the trucks and set foot to the trail which unfurled itself ahead like a magic carpet to carry us over giant passes, down sparkling meadows, to all the glories of the High Sierra. What an exciting moment that is when one steps out of modern civilization! Exciting to be armed with only the certainty of one's own strength and well-being. Exciting to realize that from that moment on there will be only the pack-trains shuttling back and forth to weave the slender communication thread.

But however eagerly the spirit flies ahead to new worlds, the feet may lag on a sixteen-mile first day. After the first eight miles the general exuberance began to grow a little wan and brunchers lazed by every stream persuading each other that they must be "almost there." How sadly we discovered that the last eight miles is always twice as long as the first. By noon we had stopped to eat so often that lunch was indeed, as the Freshman Dictionary describes it, only "the regret that there was nothing left after brunch."

The only event of our one night in River Valley was the bear that visited women's camp and made a fine feast of hardtack, raisins, a knapsack, cheese, and several bandanas, then weary from the exertion of eating other peoples' lunches, settled down for the night on two adjoining sleeping bags. It was not until the owners woke up and protested with gentle but courageous nudges that he moved away.

It was fourteen miles to our next camp at Little Five Lakes, but we set off bravely. What hiker ever let the prospect of a long hard day cast its shadow over the perfection of that moment when he swings out along the trail, free as the wind, sure of himself, every fiber tingling with life and energy. Later, as he pants and perspires up some incredible pass he may wonder why he ever let himself in for this; but the answer always lies in wait at the top. This! This

exhilaration, this beauty, this jewel-pattern of valleys and lakes, mountains and sky. This is the why. For this he would do it again and again!

The climb up to Kaweah Gap did have its heartbreaking moments—for some of us at any rate. From River Valley to the Hamilton Lakes basin was a steep pull, but a pleasant one still fresh with dew and shade. But at Hamilton Lake we were overtaken by our enemy the sun, which pinned us like moths to the glaring mountain wall. Below us the lakes receded slowly, while somewhere far ahead and unseen lay the pass. Left-right, left-right. . . . and then suddenly an oasis! We rounded a bend and there it lay—a garden of unbelievable coolness slashed in the naked rock, a stream dancing down the mountainside, oozing over wet-black rocks, leaping to diamond spray in the sunlight, showering each quivering fern and flower with jewels. Stranded on the desert, one could grow cool remembering such beauty. Another unforgettable sight that day was the frozen lake which lay cold and mysterious as a moonstone at the foot of somber cliffs.

It was a battered looking crew that gathered for dinner that night—but a happy one. Across the Big Arroyo the Kaweahs flamed their red farewell to the sun and were mirrored in our quiet lake. In the air there was a stillness and a nip which told us we were once more in the blessed High Country.

Next day a party of six set off to climb the Kaweahs, but the rest of us were only too glad to play camp lizard. That evening we had our first real campfire and the freshmen made such a good job of it that everyone was toasted into a pleasant stupor, while Ansel, trapped between the ring of Sierrans and the fiery furnace, had to issue his trail directions on the trot. Yet even with his jeans threatening to go up in smoke at any moment, he took time to severely reprimand an unnamed photographer whose beard had stampeded a packtrain on the Kaweah Gap trail.

The walk to our next camp at Moraine Lake was an easy twelve miles along the wooded Chagoopa Plateau. At Little Five Lakes some of the mules had evidently decided that if the first two days were a sample of Sierra Club trips, this was no trip for them, and when the packers went to round them up neither hide nor hair was to be found. Consequently many of us were homeless by nightfall. But at ten o'clock, just as we were preparing to bivouac, the missing

pack trains shuffled into camp and came to a standstill at the shadowy edge of firelight. Then, what excitement of unloading, searching, identifying! Caution and all Ansel's lecturing were thrown to the winds as anxious owners burrowed and scuffled about in the forest of mule-legs. The mules stood patiently through it all, but their suspicious eyes rolled wickedly in the firelight. No sooner had that commotion subsided than we heard shouts from across the lake and saw the lights of the Kaweah climbers twinkling among the trees. So, of course, we had to stay up to welcome them and hear about the trip. It was late indeed before the lake was allowed to settle down to its sleep.

The following day was spent in the lovely lazy fashion of the hiker's day off—swimming, fishing, scrubbing clothes, even "yachting" on a raft with strong submarine leanings. No need for anyone to stir from camp to find a changing scene, for all day the clouds moved across the sky in splendid parade, building and unbuilding their snowy mountains, playing lights and shadows upon the earth-mountains. Far to the northeast, against the sky's edge, Mount Whitney tossed its crest, farthest wave in a sea which billowed forward to break in showers of rosy talus upon the Kaweahs across the lake. Close at hand a million dragonflies hung and quivered, covered land and water with a pale blue smoke. They seemed to be in possession here.

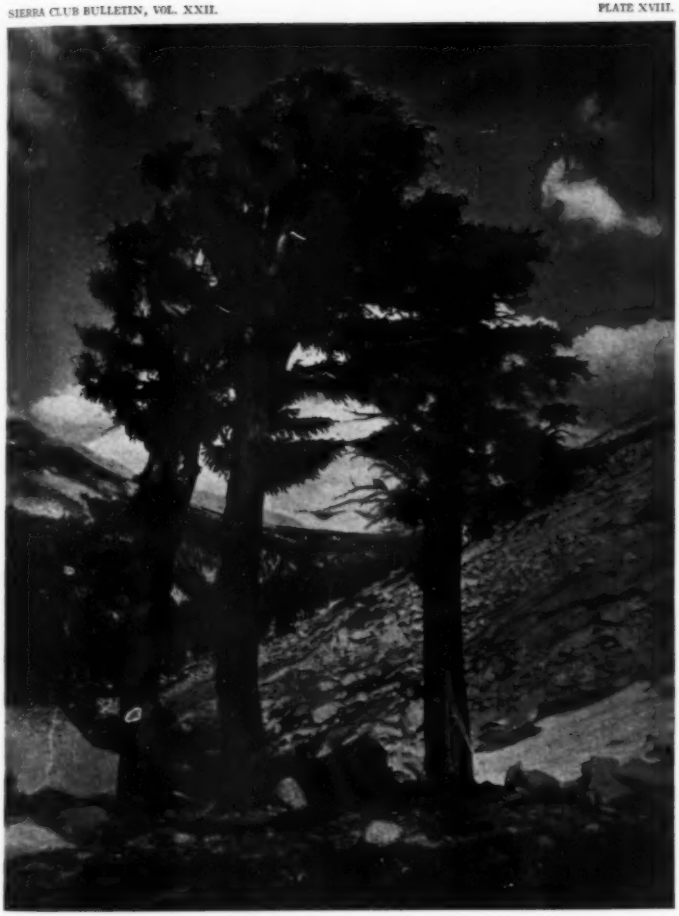
It was with regret that we said goodbye to our Moraine Lake playground and headed for the Kern. Past lovely Skyparlor Meadow with a last view of the Kaweahs, along the edge of the Big Arroyo, and finally, the long hot drop-off to the Kern—the first real test of our downhill knee action. Dust and more dust! Clouds of it. And there, two thousand feet below, were green meadows and dark trees upward-spiking. The horses seemed kindred spirits as they came snorting down through the dust, poking their noses out over the edge to have a look, pricking up their ears at all the luscious greenery, fairly licking their chops. But all their hopes went for nothing; those green meadows were not for them—or for us—for they must be passed with only a glance as we continued up the canyon.

We spent one night in Kern Canyon, then continued on to higher camp-grounds. Above Junction Meadow the gracious valley was transformed to a savage gorge, with the river thrashing angrily through its bottleneck, and the trail hanging to cliffs high above.

The water here is so exciting, so turbulent, that one has eyes for nothing else—until he happens to glance up at the opposite wall. Then he stops dead in his tracks. There, surely, is one of the enchanting sights of a lifetime. High up in the granite wall, where not even a twisted tree can find root, an exotic garden has been slashed out. The lip of a hanging valley, with trees, a white thread of stream, the promise of hidden things—pools, meadows, flowers. The kind of a place at which one gazes and gazes and thinks, "Someday I *must* go there!" And go there we would, for it was the Kern-Kaweah, and on our itinerary; but one wondered how the animals would ever scale that apparently vertical cliff.

The pull out of the Kern was steep, but after many halts "to look at the view" we reached the top and dropped over the rim into Tyndall Meadow, glad to find ourselves once more in the High Country. Our camp far up the valley was decidedly High Country, the last outpost of trees and bed-sites. The "meadow" was largely rocks, with a sprinkling of grass, and great were the quarrying activities of the Sierrans as they dug their holes for the night in a terrain where each rock led to another. Late that afternoon the first contingent of middle two-weekers began to straggle in, having walked sixteen miles that day from Symmes Creek, and climbed 6000 feet. The others came in the following day, and on the twenty-first our united party of 215 set off for Crabtree Meadow.

That day from Tyndall to Crabtree stands out as one of the most spectacular of the entire trip—incredibly beautiful and varied. We climbed out through a gap south of the meadows and rose an abrupt 3000 feet to the desolate Bighorn Plateau where scarcely a ragged tree or rock raises its head above the desert of yellow gravel. We mounted a low hill to the south of the trail and saw—oh unbelievable splendor of giants enthroned! — the Kaweahs, Milestone, Table, Thunder, Jordan, Genevra, Crag Ericsson, Tyndall, Barnard, Russell, Whitney. Great storms were sounding their drums in the distance, and above the mountains rose the clouds — some crouching black and heavy upon the earth, others soaring upward in majestic white streamers, others clinging in gray insinuating mist, stepping softly down canyons. And the clouds lent their contrasts to the earth so that light and dark played in continuous counterpoint upon the peaks. Over Harrison Pass, now black, Deerhorn glowed like a yellow jewel, where only a moment before twin points of jet had



FOXTAIL PINES

By Ansel Adams

HEAD OF THE BIG ARROYO
Kaweah Gap at the left
By Ansel Adams

HEAD OF THE BIG ARROYO
Kaweah Gap at the left
By Ansel Adams

STORM CLOUDS OVER THE KAWEAH PEAKS
By Ansel Adams

THE MOUNT WHITNEY TRAIL
By Cedric Wright

THE MOUNT WHITNEY TRAIL

By Cedric Wright

A SIERRA CLUB CAMPFIRE

By Cedric Wright

KERN RIVER SOURCES

By Ansel Adams

KERN RIVER SOURCES

By Ansel Adams

MOUNTAIN-MEADOW STREAM

By Cedric Wright

By Ansel Adams

hung over a golden pass. Except for the occasional roll of thunder the silence was absolute. Every bird and insect, the wind itself, seemed to be holding its breath to listen for the plop of the first raindrop.

Finally we heeded the thunder's warning and dropped down to the plateau. After crossing a friendly meadow our trail led us up into a lost world—the sweepings of some glacial giant; ragged boulders, a few twisted trees, leafless, lifeless, as things that feed on granite. Here nothing lived, and it was with intense relief that we descended once more to meadows and pleasant forests. The rain came on, and we stopped for lunch under a tree. Then suddenly the whole earth shook in one simultaneous flash and crash. We must have made a comic picture as we stood there in arrested poses staring at one another. A tree not two hundred feet away had been struck. Lucky thing it wasn't any closer! The lightning had clawed a deep white wound from top to bottom, and littered the ground with pungent-smelling shreds of tree-flesh. After our tour of inspection we returned to our lunches, but kept an uneasy eye out for lightning bolts that might be traveling our way. We drew small comfort from the philosophic, "Oh well, if you're hit you'll never know it."

Our four days at Whitney Creek were a paradise for climbers and camp lizards alike; but even the most confirmed lizards managed the ascent of Mount Whitney. In all, one hundred and sixty-two persons climbed to the highest point in the United States. By foot and by horse, by trail and by ropes, they swarmed up its sides till the ancient mountain must have felt no more significant than an ant hill. Even the uncompromising East Face surrendered once more before the ropes, technique, elbow grease and determination of eleven human flies whose ascent added "Shaky-Leg-Crack" to Sierra place names.

This camp more than any other seemed a place of comings and goings. Breakfasts were staccato with cries of leaders gathering up their flocks, "Everybody for Mount Russell!" "Mount Barnard!" "Whitney climbers!"—reminiscent of the exciting "All aboard for Omaha, Cheyenne, Ogden, and all points west!" Then the dinners, with weary climbers straggling in, the greetings, the endless discussions about "that traverse" and "that rock that started to come loose." No, the Grand Central Station offers no more turmoil than a Sierra Club stay in the Whitney region. Even the mules caught the spirit, and morning and night went jingling through camp,

By Ansel Adams

frolicking as though there weren't a dunnage bag in all the world.

Over all this commotion Mount Whitney brooded; the myriad spires and arêtes of its western face burned like candles in the late afternoon sun; at night its hulk loomed, a blacker night against the stars.

The trip back to Tyndall Meadow was made under a heavy sky. Some of us who had seen the lightning strike that tree were not quite happy crossing the long exposed stretch of the Bighorn Plateau with the thunder rolling close in and the lightning snapping at our heels. How good at last to look down through the rain and see, far below, the valley and the blue wisp of smoke which marked it "home."

"It never rains in the Sierra at night." These words, with a ring of authority about them, were hopefully mumbled from one dripping form to another as the Sierrans stood around the campfire absorbing rain a little faster than they could give it off in steam. We went to bed in a downpour and woke up to the rat-a-tat-tat of rain on ponchos. Of all the "lows" in existence this was the lowest! Being awakened at 4 A.M. to find oneself afloat inside a "waterproof" sleeping bag; crawling out into the rain, inching into soggy clothes with the water trickling down one's neck, into boots, socks, gluing clammy jeans to clammy legs. The one bright ray on that most miserable of mornings was that they didn't weigh our dunnage.

But Dan's coffee and oatmeal, and the excitement of being on the move, can work wonders with even the most abject of drowned rats. Soon faces were brightening, feet hurrying to be on the trail. There was only a four-mile trip ahead, and the rain had subsided to a drizzle. We followed the trail up Tyndall Creek for a few hundred yards, then branched off to the west. From the top of a ridge we beheld one of the superb views of the trip—the deep gash of the Kern at our feet, Milestone Creek directly opposite, and, stretching away to the west and north, the massive wall of the Kings-Kern Divide. The rest of the trip that day was down through a little paradise of meadows clinging in brave gay ribbons to the ridge's westward fall, and full of the exquisite beauty of small things—miniature streams singing through the grass, footstools of plushy moss, unseen frogs dropping into pools with a plop-plop.

Our camp at Milestone, poised at the top of a granite cliff hundreds of feet above the Kern, seemed the jumping off place of all

waters; everywhere were rivers, rushing, leaping, tumbling, in a mad race to the valley floor. In a white fury of haste they boiled past us down the cliffs, and their thunder shook the earth.

Most of us however will remember Milestone less for its rivers than for its rain! In the four days of our stay the storm gods never once failed to keep their appointment, arriving punctually at noon and withdrawing at four o'clock. The first day that the clouds rolled up over the lunch line and the rain began its devil's tatoo on tin cups and plates, we stood around under trees looking miserable, waiting for it to clear. After that the Sierra Club found its sea legs. The more aquatically minded went ahead with climbing plans, ascending such peaks as Milestone and Thunder; others simply went to bed. All over camp the most amazing housing projects sprang up—ponchos tied to trees with bits of string and anchored with rocks; "tents" rigged from groundcloths, parkas, raincoats, and surrounded with elaborate drainage canals; while here and there a few real tents raised smug heads as a sort of "I told you so" to the improvident. Bridge and pinochle parties were the order of the day, and woe to the player who could not sit as still as a granite slab. The slightest sudden movement and he would have a bucketfull of water down his neck, or the whole arrangement of ponchos, shoestrings and raincoats would be tumbling about his ears. As though these excitements weren't enough, the campfire builders kept everyone in a state of suspense by felling trees in unexpected directions.

At four o'clock, when the rain ceased, we would all emerge tentatively, like the animals from the ark, search the sky for a patch of blue, and set about the business of drying out. By nightfall it was always more or less clear; the moon would slip across the sky, touching rivers and granite to radiant life, splashing-in the tree-shadows with inky black.

On the entire trip there had been scarcely a campfire without its special treat—Virginia Adams' singing, talks by Mr. Colby and Mr. Matthes, Dan's Fourteenth of July celebration—to name only a few. But it was at Milestone that the Sierra Club blossomed forth into its gayest night-life. We had three plays, and the demand for footlights was so great that our flashlights were dim for the rest of the trip. The culminating event was the Freshman Show, the freshmen's great moment for having a little fun at the expense of the old-

timers, who for evenings on end have sat comfortably toasting themselves at the fire, shouting "More wood!" whenever the spirit moved them, and watching the freshmen jump.

On the thirty-first the middle two-weekers left, and on the following morning the rest of us rolled up our dunnages, weighed in, and set out for the Kern-Kaweah, happy to be on the move once more. On August third, before the sun had more than brushed the highest peaks, we were on our way up toward the 12,000-foot Colby Pass. The warnings about this as a wind and muscle tester had been so dire that it turned out to be much easier than anticipated. In fact the summit looked so close that we thought (with a skepticism born of other Sierra passes) it must surely be a false summit, and that as usual the real top would keep on receding while we panted after it. But Colby Pass was unique, for the top *was* the top.

We had a brief rest, then remembering the injunction to be off the top before the pack trains arrived, shouldered our knapsacks and took the plunge off the west side. And what a plunge that is! It was fun to watch the various downhill techniques; some came down stiff-legged, placing one foot before the other gingerly, as though expecting each step to be their last in this world; others ambled loose-jointed, knees sagging, arms flopping. But it took Commissary to show us how! There was a shout from above, and one moment later a great cloud of dust propelled by a dozen flying legs whipped past and was gone; we had just a glimpse of familiar grinning faces.

The rest of the day was an endless down—down a long sloping valley to the east rim of Cloud Canyon, abruptly down into the canyon, then down the canyon itself. The view from the canyon rim was like a glimpse into some small enchanted world. There, hundreds of feet below, was a doll's garden of a meadow with a toy stream, and trees, and cattle no bigger than mice. All very far away and unreal, yet as exquisitely etched and vivid as the unrealities of a dream. One could fancy he heard the faint sound of bells—or was it only the wind in the tree overhead? At last we stirred from our trance. After all, we must be on our way if we were ever to reach that lovely resting place.

But there was no rest. The first thing we saw on reaching the valley floor was a sign, "Two more miles. Stagger on." The charming "miniature" cattle apparently had squatters rights; we passed

through their meadow with no very friendly feelings, licking our chops at the thought of how good steak would taste for dinner. At the end of two miles there lay only wilderness—and another sign. Due to "unforeseen conditions" it would be another mile and a half. This began to look like an ill-advised treasure hunt, and we despaired of ever catching up with our will-o'-the-wisp camp. But finally, just as we were steeling ourselves against another sign, we rounded a bend in the trail, and found oureslves "home."

The following day we continued on down Cloud Canyon, across Roaring River, and up Deadman Canyon. Glorious as the High Country is, one grows parched after a time, and this day of shady forests, meadows, and flower gardens was like a dip into Eden. After days of walking to the clatter of nailed boots on stone, how peaceful to go silently along pine-needle trails, to see no vast sweeps of granite and sky, but only the dusky forest, the warm red trunks of Jeffrey pines, pale sunlight sifting down on ferns.

Of all the campsites of the trip that in Deadman Canyon was the loveliest—or was it only because this was our next to last camp, and the blessing brightened? It seemed the spot most poised between heaven and earth, the most magic at sunset, nearest the stars at night—a place to spend weeks. But the inexorable little green schedule was stronger than all our longing, and on the second morning we took our sad leave and turned up the canyon toward Elizabeth Pass. Everything about this canyon was as bewitching as if Circe had been there; even the flowers had woven a spell of enchantment and stretched away in every direction, thousands upon thousands—more than we had seen on the entire trip—in one glorious grand finale of color and endlessly varied form.

Leaving Elizabeth Pass was like closing the door upon the High Country—for another year, at least. From that moment we moved steadily on, over improved trails, toward our starting point—toward automobiles, roads, houses. No wonder we loitered along the way! And when we finally wandered into camp at Lonepine Meadow we were sorry not to have loitered more, for Lonepine was even more treeless than its name, and the "meadow" was nothing but a stretch of sun-baked sand. Everything possible, however, had been done by the Park Service and the CCC boys to make us comfortable. There were real tables for commissary; and for once the freshmen enjoyed a campfire not of their own building. We celebrated our

last campfire with singing and talking far into the night, voices and spirits not the least subdued by the prospect of a 3:45 call.

But next morning it took more than the usual shouting and caterwauling to persuade us to get up. It was against nature to crawl out of a warm sleeping bag when it was still night, to dress and eat breakfast by moonlight. The half-light of early morning found us on our way, and before the sun had tipped the highest peaks we had hit the High Sierra Trail, which looked passable for an automobile after the goat-paths we had grown accustomed to. At Bearpaw Meadow many of us could not resist the first foretaste of civilization and stopped for a joyous feast of scrambled eggs, coffee, toast, and marmalade. The more hardy passed this temptation by—and looked a trifle superior — but when we reached Giant Forest we found them all at the soda fountain. For the rest of the day the Sierra Club activities were: bathing and eating.

How happily we took to automobiles and radios and telephones again, almost as though the mountains had been a dream. Perhaps, indeed, they are a dream and that only this is real — this world of human beings, working and fighting, building and destroying. But what a dream! Of what rich and precious texture! Enough to last a lifetime.

It is winter now, with dunnages stowed away for another year; over the Sierra the clouds are spilling their white snow-feathers up and down the range, erasing, shrouding, leveling, until all the summer scene is gone. But not one flaky crystal of winter can fall upon our bright remembered summer. In that remembrance jeweled mountains and meadows still turn a million facets to the sparkling air; the water ouzel still makes curtsies to the stream; and silence broods upon the lake at sunset. We are indeed "rich forever." But what misers too! Never content with our store of treasure, already plotting and planning for next year when we can bring out of their dark corners our old dunnages, jeans and boots, and set forth to add more riches to our hoard.

THE CASCADE RANGE IN NORTHERN WASHINGTON

By Hermann F. Ulrichs

THE Cascade Range is a strikingly individual link in the great Pacific Coast mountain system. Roughly two-thirds of the range has been thoroughly explored and is fairly well known. The northern section still remains the last great stronghold of almost completely untouched primeval wilderness in the United States, and, as in course of time it becomes better known, it will probably be regarded as the most spectacular, varied and truly Alpine of all our mountains. It may seem strange at first that a region so rich in interest for the mountaineer, and of such unique and impressive beauty, has remained so completely unknown to this late date. Several reasons for this present themselves. One is the lack of curiosity among mountain climbers, who have looked upon the range simply as something to pass by on their way to Alaska, Canada, or Montana. They have contented themselves with an impression that, excepting for a few snow-covered volcanic peaks, the Cascades consist merely of low, secondary ranges, chiefly forested, possessing at best only mediocre attractions for the climber. The other reasons will become apparent in the course of this article.

In attempting a description of the Cascades, an anomaly at once presents itself. It is a homogeneous range such as the Sierra Nevada, but seems to be composed of two quite distinct and different systems. The most extensive and best known of these can conveniently be designated as the Oregon System. Popularly supposed to end in Oregon, it actually extends south of Mount Lassen, in California. The country surrounding the latter peak, as well as Mount Shasta, obviously shows many more characteristics of the Cascades than of the Sierra Nevada. In form, this system throughout Oregon is a simple divide, averaging fifty to sixty miles in width and consisting of forested ranges 5000 to 6000 feet in elevation, upon which is set a series of imposing isolated volcanic cones and remnants, some of which rise to twice that height. As the range progresses northward, there is a steady increase in architectural grandeur, as well as in the extent of snowfields and glaciers. This procession of stately and nobly proportioned snowy summits is the most distinctive feature of the Cascades, perhaps unique among mountain ranges. Serene

and contemplative, they give a peculiarly personal and poetic charm to the landscape. Wherever the climber goes, he is sure to see in some direction one, if not several, of these solitary sentinels, often floating like a vision or a mirage above the lower mists, strangely unreal and ethereal, and by their loftiness dwarfing the surrounding country. Though actually the youngest of our mountains, the impression given by their tranquil repose and ample flowing contours is that of great antiquity. Other mountains seem young and turbulent in comparison.

Moving northward, one finds the great cones situated on the axis of an east-west divide until Mount Adams (12,307 feet) in southern Washington is passed. Northward from Mount Adams they are crowded farther and farther to the west by the advent of a new divide system, which, until well north of Mount Rainier (14,408 feet) remains in a transitional state. Beyond, are two more great ice-clad volcanos, Glacier Peak (10,436 feet) and Mount Baker (10,870 feet), both extraordinarily beautiful in form and surrounded by unsurpassed forests. These close the Oregon System at the International Boundary. Encompassing these northerly peaks is a very rugged and complex system, entirely different in structure from that farther south. As this system and its typical characteristics form an unbroken progression into the British Columbia Coast Range, which culminates in the Mount Waddington group, it seems proper to distinguish it as the Canadian System. In the Oregon System masses of scoria, pumice, and andesitic types of rock predominate, very rotten and unreliable for steep climbing. In the Canadian System, the rock is largely schist, with some slate and several great upwellings of granite and granitic types, which results in an obviously different type of mountain architecture and greatly increased safety and reliability for climbing. The drainage system formed by the main divide, which has now exchanged its simple north-south trend for a progression of tortuous loops, is quite intricate. Deep river-valleys strike out towards all the cardinal points of the compass. Further complications are made by the highly developed lateral divides and parallel secondary ranges, which often challenge the main divide in height and ruggedness. The width of the range, also, has been trebled, while the general elevation has increased to 8000 or 9000 feet. The commingling of these two diverse systems gives an inexhaustible variety to the range.

Upon entering the mountains from the west, one is first struck by the dense and apparently limitless forest, completely mantling the valleys and ridges up to an elevation of about 5000 feet. One's first impression, of being imprisoned in a deep green cavern, cut off from the open sky, deprived of all outlook and freedom of activity, eventually succumbs to their mysterious, brooding, and really unknowable quality, and in the end the experience of traversing them to the heights beyond comes to be treasured for its own sake. To penetrate these vast and silent reaches is to enter a world steeped in a perpetual cathedral twilight of dim gold and green half-lights. Great pillar-like firs, over 250 feet high, mingle with spruce and cedar, almost rivaling them in size. The undergrowth, particularly in the valley bottoms, is tropical in its luxuriance and impenetrability. Devil's-club abounds; but the greatest obstacles are the huge fallen trees, which, in the moist climate, decay very slowly and frequently support several generations of young trees upon their prostrate sides. The fern and moss life is very abundant, but not the floral. The scarcity of bird life makes these forests seem extraordinarily silent. One bird, however, seems to be quite common, but I have not encountered anyone who knows what it is. It has a little song of one tone, repeated over and over, rather like the sound that might be produced by the striking of a small steel bar. It is a cool sound, which for some inexplicable reason I always associate with the drip of clear spring-water. The pitch varies with each bird. This succession of delicate light sounds, drifting tenuously down through the dense foliage, accentuates the silence and epitomizes in a magical way the elusive spirit of the forest. Only occasionally do the trees part to give a momentary view up some deep, precipitous side-valley, with perhaps the gleam of a waterfall or distant sharp snowy crest far above to carry the eyes upward. Otherwise, the traveler moves in a world from which all distance has been annihilated. In stormy weather these forests become dark and sombre; the low-lying clouds shred themselves against the tree tops and the gloom makes the silence even more profound.

The very deep valleys, carved by the large rivers that foam impetuously toward Puget Sound, are in the mature state, erosion having penetrated well towards the base-level. They are characterized by very low gradients, a half of one per cent, and even less, to within a few miles of their sources, where there is a sudden, abrupt

rise of two to three thousand feet to the narrow defile-like passes. The numerous large tributaries have carved gorges almost equally deep, thus giving the region a very rugged dissection which forces all approaches to be made up the valleys at quite a low elevation. From this it follows that, although the absolute elevation of the peaks, only a dozen or so of which top 9000 feet, may seem quite modest in comparison with the numerous 13,000- to 14,000-foot peaks of the Sierra Nevada and the Rockies, the relief is so much greater that they have a decidedly grander appearance. The truly Alpine aspect engendered by the permanent snowfields and hanging glaciers, which appear on the peaks from 7000 feet up, together with the frequent very precipitous cliff-formation for thousands of feet, contrive to make these mountains seem much more lofty than those of nearly twice their elevation in other ranges. The differential elevation between valley-bottom and summit is consistently double that of the Sierra and frequently still greater. Mount Whitehorse (6850 feet), a peak of a secondary range on the western slope, rises nearly 6500 feet in one unbroken upthrust from the town of Darrington at its northern base and only two miles air-line from the summit pinnacle. Mount Baker rises 10,000 feet above the little town of Glacier, where the trail to the northwest route commences. Mount Eldorado (8875 feet) rises 7000 feet in a little over two miles air-line above the Cascade River on the south, and the west side probably shows an even greater relief. Glacier Peak rises 8500 feet above the Suiattle River at its northern base; while, on the east side of the range, Mount Goode (9300 feet) rises 5300 feet above the last possible camping-spot on Park Creek, the western base, 6000 feet at the analogous spot on the eastern side, and from the abrupt terminus of the long south ridge there is a rise of 7200 feet to the final summit pinnacle.

In form, the peaks are narrow wave crests of rock, slender in profile, guarded by precipitous and smooth-appearing cliff-ramparts. Lateral ridges are usually abortive, and the deeply serrated and very jagged character of the main ridges forces the climber onto open faces or into chimneys. Spire and pyramid forms predominate, and extraordinarily fantastic and slender minaret and turret forms are common on the ridges. The rock is rather smooth and glassy and is not as plentifully supplied with holds as in the Sierra and the Canadian Rockies. It is a little slippery for nailed boots which

are, nevertheless, indispensable for the steep glaciers, the snow-fingers, and the ice-couloirs.

The eastern side of the Cascades, unlike that of the Sierra, is as extensive and as highly developed as the west. However, the decreased precipitation has brought about a decided modification. The forests are much drier and more open, with pine predominating. There is a great increase in floral and bird life, and the numerous clear, rushing streams make camping particularly pleasant. On the extreme western edge of the range the precipitation is as high as one hundred inches a season and this decreases to as little as eight inches at the extreme eastern edge. This makes the eastern ranges increasingly arid in proportion to the distance from the main divide. A really satisfactory averaging of the two extremes is found just east of the divide. The deep V-shaped, gorge-like valleys of the eastern side have more extensive cliff formation and are even more impenetrable at their heads than their relatives on the western slope. The trail up the West Fork of the Agnes, for instance, ends in meadows at about 3000 feet elevation, underneath a grand semi-circle of glacier-hung peaks which rise from 5000 to 6000 feet above. Several of these summits have not as yet been climbed—only the most determined mountaineer will force his way through the dense undergrowth of this closely guarded region.

The crowning glory of the Cascades is, for me, the unusually extensive subalpine zone, which commonly begins above 5000 feet and makes a rich green fringe between the ultimate edge of the forest and the everlasting rock and snow. Here there are miles of velvety lawn-slopes, carpeted with flowers in the most unexampled profusion, through which the climber literally has to wade. I have seen the cassiope flowering so abundantly that it appeared as if a miniature snowstorm had just passed. Countless little rills and cascades dash down from the melting snows to water this delightful terrain. The symmetrical spires of the trees are grouped into informal designs, giving a park-like atmosphere to the landscape. There is always a lake or a heather-bordered pool to reflect the great masses of white cumulus clouds in the deep blue sky. These are really the "green" mountains, with their verdency and freshness, though the great abundance of cascading streams attests the aptness of their generic title. It would be hard to imagine a more striking and felicitous contrast than that between this idyllic, really Ar-

cadian country, of intimate beauty and delicacy, and the almost savage ruggedness and grandeur of the big peaks, the deep valleys far below, and the magnificent panoramas of distant snowy ranges glowing in the soft light.

My attention was first drawn to this country in the winter of 1931-32 by the appearance on the Mount Baker National Forest map of place names, streams, and a few elevation marks on a large section that had hitherto been completely blank. There are still about 2000 square miles of mountains—everything east of Mount Baker and between Cascade Pass and the International Boundary—for which no topographical maps are yet available, and the climber has to depend upon the somewhat sketchy and empirical Forest Service maps, which show very few elevations. As I was unable to gain any information about this country, the only solution was to make a personal exploration, which entailed a good deal of strenuous back-packing, as most of this country is not accessible to horses. With the exception of the western fringe and a few peaks near the more accessible passes, which had been occupied by the U. S. Geological Survey, the region proved to be virgin territory for the mountaineer. The few settlers, particularly those on the eastern side, found it inconceivable that anyone could find anything of interest in the mountains other than fishing or prospecting. When they were not busy imparting a store of almost fabulous misinformation, they contented themselves with the withering witticism, "No sir, I never lost nothing among them peaks!" Even now, I suspect, they cannot view that baffling and incomprehensible species, the climber, with a suitably indifferent equanimity. A good many widely separated regions were visited, some of which appeared better on the map than they turned out to be in actuality, while others surpassed all expectations. As is always the case with pioneering, a good deal of effort and time was spent in finding out what was *not* the best approach, but that all has to be charged to reconnaissance. Then, there was the occasional handicap of bad weather. But, notwithstanding, some twenty-one first ascents crowned the struggle. Nothing in the Canadian Rockies or the Alps has given me quite the same thrill or inspiration as that which came from penetrating these lonely valleys with eager curiosity to see what lay at the head of them, or as I pulled myself over the final ridge with beating heart to see what unknown wonder might lie beyond. There is an inde-

finable bloom, a mysterious and haunting loveliness that lies over all country that has not known the hands and hoofs of the despoilers. How quickly it disappears before the loggers, the miners, the hunters, the sheepmen, and the recreational experts!

The first ascent of Mount Silver Star (8903 feet), a striking peak east of the main divide, at the head of the Early Winters Fork of the Methow River, proved a very interesting climb. Darkness found us staggering into camp by the last timber directly under the south face after an over-full day of back-packing, the latter part of which had been through rough trailless country littered with innumerable fallen trees. There was no shelter, but the night appeared fine as we turned in with hopes of an early start in the morning. During the night a violent thunderstorm broke out, followed by a fall of heavy wet snow, which can demonstrate more rapidly than anything else I know that sleeping bags are only partly waterproof. After a most uncomfortable night, spent in envying the warmth and dryness of campers in the desert, we arose near dawn, as the storm began to abate. The sun came out while we were still drying each article of clothing over a fire which possessed the only enthusiasm in the party. A few hours' more sleep, and we woke to find it a bright day, the snow almost melted in the meadow. Stock in the climbing venture soared immediately.

From our limited, foreshortened veiw, the east peak looked definitely the highest. The east and west ridges appeared so wildly serrated that they looked hopeless in view of the limited time remaining. The most direct route was to climb the south face to a rib which extended about halfway down from the spire summit. For 2500 feet this face is one clean, very steep upthrust of solid granite, the lower part of which is highly glaciated. I have never seen the actual foot of a mountain so inhospitable. After trying a number of cracks and small chimneys which petered out above into slick, holdless slabs, we found ourselves several hours later still at the starting point.

The afternoon was wearing on. We decided to drop this line of attack, and retired highly disgruntled and annoyed with the mountain. It seemed too late to endeavor to find another route, so photography was in order. In climbing into the alcove of the junction of the southwest ridge with the south face to photograph this spectacular face in profile, I suddenly became aware of a promising

ledge running diagonally across the face above us. A new hope sprang up, and we began climbing furiously to discover if this was accessible and would lead into the desired direction. The ledge reached, the little distance we could see before an abrupt jutting corner terminated the view looked promising. We set off with a will, but with an unspoken feeling that we ought to appear elaborately indifferent and thus fool the mountain. It worked! The face was more broken here than the slick, flat planes of our first attempt. The ledge was not continuous; but, by constantly utilizing the ledges formed by the granite slabs and climbing upward from one likely one to the next, we managed to maintain a fairly steady upward diagonal towards the desired rib. Sometimes the ledges were ample; at other times it was like edging along the narrow sill of a skyscraper. Ice and fresh snow on the holds did not add to the security and tended to freeze the fingers unconscionably.

The rib reached, we peered across its crest to the face on the other side and immediately thanked our lucky stars that an attempt had not been made by either this face or the east ridge. The rib had appeared practically vertical to our uneasy minds as we approached, but in comparison to this dizzy precipice it looked almost reassuring. Some breathless, straight-up climbing brought us to the final slender spire; but, turning our eyes westward, we saw to our intense dismay another, slightly, but unmistakably, higher. The ridge between was a wild-looking knife-edge, fragile and deeply gashed. The sun was low in the western horizon and the chill of the September evening was setting in, but nothing could deter us now. That spire had to be reached. Without stopping to build a cairn, we set off.

Geoffrey Winthrop Young, in "Mountain Craft," says something to the effect that if a climber has not enough breath to whistle a complete musical phrase as he climbs, he is climbing too fast. We thought we had been climbing rapidly before; now we seemed to be trying to fly. Neither could have whistled more than a few notes at the most. Off went the rope—it made progress too slow. The slabs, tilted on end, were wonderfully firm, but smooth, and friction had largely to be depended upon. *A cheval,* back and knee, scrambling with hands on top and feet frictioning against the vertical surfaces—anything to make time. The apparent difficulties yielded in the most unaccountable manner and we went at it more and more exuberantly. By this time we had agreed that this route was not one

for a descent; at the worst we would try to descend the glacier on the north face to the first timber and sit around a fire all night—a reassuring, if not entirely dependable, alternative.

A deep notch suddenly halted our progress and left us poised uncertainly on the overhanging pinnacle above it. Uncoil the rope and *abseil?* No, it would take too long. The south face of the ridge was very uninviting; the north face led off with a steep, holdless twenty-foot slab, ending at a small ledge, from which it appeared possible to work down and into the base of the notch. Here the technique acquired in early years on banisters and the summer-house roof proved its worth. The simplest method of descending the slab was to lie back and slide, catching the heels on the ledge below. There was no difficulty—only the ledge seemed to shrink to a mere wrinkle and the glacier seemed a tremendous distance below in case the mark should be overshot. It went with a rush. I looked back, with a half-formed thought relative to the possibilities of sliding up slabs in case of an enforced return—but we were in the notch before it was ever finished. We were now certain that the mountain's defenses were exhausted. A little more very exposed climbing—and suddenly we were building the cairn with numb fingers below the vertical knife-edge slab that formed the final and indisputable summit of the peak. A wild red sunset was growing dusky behind the western ranges and the wind was bitter. The promise of an easier descent did not annoy us. The large notch between the point on which we were and the lower mass that forms a spectacular western peak was reached by easy slabs on the north face. The glacier was now accessible, but the gathering darkness found us descending a straightforward couloir which had to be treated carefully on account of loose rock, but which offered no difficulty. Long after dark we stumbled into camp, tired but elated.

To my mind the finest part of the range is the main divide north of Glacier Peak between Suiattle and Washington passes, especially the first stretch from Suiattle to Cascade Pass. A rugged complex of fine peaks and impressive glaciers presents a formidable barrier, both east and west. Very few of the peaks have yet been ascended; in fact none of them had ever been attempted until the summer of 1935, when a party from Portland in two successive days made the first ascents of the two summits of Mount Sentinel (8200 feet). Two members of the party returned in 1936 and made the first ascent of

Mount Agnes, a decidedly difficult-looking spire. Another party had previously climbed the west summit of Dome Mountain (8860 feet) from Sulphur Creek, while a party from Everett climbed the east summit from the opposite side of the range—both first ascents. Mount Goode, after repelling eight or more assaults, finally succumbed to a thoroughly equipped party with a complete knowledge of the problem to be solved. Pitons were necessary as direct aids in the final pitches. Another day, on a hurried reconnaissance trip through virgin country, after eight hours of continuous and strenuous climbing, we found ourselves about 300 feet below the unclimbed summit of Blue Mountain (8200 feet), on the east ridge. We were too much pressed for time, too fatigued, and too conscious of the distance back to camp, to want to cope with the very obvious difficulties ahead. Pitons are in order here, also. They were also necessitated on the first ascents of Mount Challenger and Mount Whatcom (elevations not known), farther to the north. On other still unclimbed peaks, judging from the appearance, they will be very handy, if not an absolute necessity. South of Cascade Pass, rising from 5000 to 6000 feet between two forks of the Cascade River and immediately west of the divide, is a grand, unclimbed peak, listed on the map as 8350 feet. Considering its precipitous cliffs, jagged arêtes, and hanging glaciers, I suggest the name "Mount Formidable," as expressing the quality of the peak.

In the extreme north, along the International Boundary, there is a very wide belt of practically unknown mountains extending both east and west of the divide. I am not prepared to say whether there is any interesting climbing there or not. A very fine group of very little explored mountains, known as the Picket Range, on account of the array of vertical spires and pinnacles, lies to the west of the divide between the Skagit River and Mount Shuksan. There are some rather extensive glaciers here also. This section has been set aside by the U. S. Forest Service as a primitive area. Characteristic of the Cascade Range are frequent torrential streams, difficult, and often dangerous to ford; steep-walled valleys, highly serrated ridges, and precipitous side-gorges; thickets of devil's-club, stream alder, and briers; the uncertain footing of the treacherous moss and rotting vegetation; above all, interminable numbers of huge fallen trees, over which one has to haul oneself laboriously—factors which make progress slow, arduous, and discouraging. The traveler who sticks

to the trails is forced to make his way continuously through deep low valleys, with dense vegetation cutting off all outlook. Even the passes yield only limited views, so that it is possible to cross from one side of the range to the other yet see practically nothing of it. Not until one climbs the high ridges can a real conception of the country be obtained. There are very few ridges accessible to horses, so the country still remains largely the domain of back-packers. This explains why this portion of the Cascade Range has so long remained unknown.

The only maps of the country are the Mount Baker and the Chelan national forest sheets and the Glacier Peak and Stehekin quadrangles. The most direct and beautiful approach to the heart of the range is by way of Lake Chelan, which will some day be classed as one of the unique wonders of the nation. This narrow fiord-like lake is fifty-six miles long, with a maximum width of two miles. The surface of the lake is 1073 feet above sea-level, but the lowest part of the bottom is more than 300 feet below sea-level. The water is indescribably clear, and in some spots the walls rise more than 7000 feet from the water's edge. There are no roads, and the four and one-half hour trip by boat to the head is a constant crescendo of impressive grandeur and beauty. At Lucerne, on the west shore, or at Stehekin, at the head, horses may be procured, but at quite a high figure, for trips up Railroad and Bridge creeks or the Agnes and Stehekin rivers. Arrangements could be made to come out down the west slope by way of the Cascade, Suiattle, or Skagit rivers. The trails are few and rather poor. The best month is August. Deep snow, fallen trees, swollen streams, and the usual wreckage from the winter and spring avalanches make the existing trails almost impassable for animals until cleaned by the maintenance crews. In general, this region of the Cascades, from its nature, would seem to belong more exclusively to the mountaineer than any of our other ranges. There is so much ice and snow in these mountains that they should furnish the most complete and varied training ground in the United States. They appear to rank first in the number of big peaks that require the use of pitons for a successful climb, even by the most obvious route. Very few of the peaks have been climbed more than once, and there await for skilled climbers a multitude of magnificent alternative routes of first class difficulty.

CLIFFS AND WATERS OF THE GRAND CANYON

By James N. Smith

FOR the last three months of 1935 it was my good fortune to be one of the members of a boat expedition down the Colorado River through the Grand Canyon. Twice we descended from Diamond Creek, Arizona, through the Lower Granite Gorge, four to five thousand feet deep, emerging at Pierce's Ferry, the end of the Grand Canyon, and, at that time, the head of Mead Lake, eighty miles above Boulder Dam. Our party, organized by Fairchild Aërial Surveys, Inc. in connection with soil conservation work, on the first trip erected surveying signals, cached food, and explored; and on the second, surveyed down the canyon by triangulation.

The trip was well planned. Our four boats were the best ever used on the river, the final result of a seventy-year evolution of Colorado River boats. They had little flare and much free-board to prevent swamping, were flat-bottomed and of toughest Philippine mahogany to prevent damage from rocks. Since these boats are always run through a rapid stern-first, or backwards, the stern was designed to rise quickly to the waves. Water-tight compartments fore and aft added buoyancy.

Hualapi Indians from the reservation helped us to blast and shovel a species of road the twenty-two miles down to the river by way of Peach Springs and Diamond Creek canyons. Down these twisty, boulder-strewn washes we pushed and pulled the trucks, sometimes high on the top of boulders, sometimes hub-deep in wet sand. It took ten or eleven hours to reach the river, where we made our first camp on a sand bar at the head of Diamond Creek Rapids.

I have not yet seen the Grand Canyon from the rim. I am sure it must seem immense and ageless but nevertheless quite dead. It certainly did not look dead down there in the bottom. How anything made by man could be navigated over those brown swirling waters seemed incomprehensible. Like a flood from a broken dam, it seemed a transient thing that would subside into nothingness again. Evil-looking rocks which showed momentarily led me to suspect that beneath all soft-looking waves similar menaces lay hidden.

However, the handling of the boats, although interesting, was not my problem. Deep darkness came while the last of the sun's rays

were still tinting the eastern wall. It was time for the first radio schedule with our base station in Pasadena. From nearly a mile down in the earth we had perfect communication with the outside world. The old timers, frankly disgusted with the luxury of radio, nodded approval when I received the report that Chicago had beaten St. Louis in the National League series. Later I contacted Milford, Utah, for our daily flood report. Forewarned of a cloudburst flood bringing a six-foot rise which would have had them up in the middle of the night, our still contemptuous boatmen became more enthusiastic in their praise of radio.

The next two weeks of the first trip found us working hard setting signals on the first bench, a thousand feet up. The climb was usually made by way of side canyons. Many of these were beautiful, with lovely falls, weird caves and arches of travertine, luxurious growths of maiden-hair ferns, and large cottonwood trees. Others were desolate and dry, beautiful in a different way, with their colored pools of mineral water, which we were at times forced to drink, usually suffering for it later. Our progress was often blocked by sheer walls, fascinating in their rock-climbing possibilities. My frequent attempts at short-cuts so dismayed Woody, our chief, that he firmly told me I must stop else I would not come along next trip. Not knowing just how to interpret that statement, I never climbed the rocks anymore when he was around.

One lazy day in camp three of us decided to explore a fine little canyon which emerged by a waterfall into the river. We were equipped with rope and a movie-camera. Our first pitch to the top of the waterfall was moderately difficult. Once in the gorge, however, we found the going more difficult. From pool to pool we climbed by using occasional convenient ledges, friction holds on the water-worn faces, or back-and-knee in the spray. It was wet, and exciting fun with the prospect of a bath as the consequences of a fall. On the return, while climbing last, my foot jammed in a vertical crack so tightly that when I jerked it out I went over backwards into a pool below, cracking a bone in my left hand and dazing myself with a blow on the chin. My companions were persuaded not to tell Woody of our adventure.

At only two points was it possible to climb out of the canyon, or "rim out," as the boys called it. With difficulty a few signals were set as high as the third bench. Above this height were more tiers of

benches before the red sandstone rose unbroken for two to three thousand feet. Several times we saw mountain sheep on ledges high above the boats, and once, when taking a barometer reading far up in a side canyon, I came upon a large ram who calmly surveyed me from a distance of forty feet before jumping out of sight. Weeks later, when we were running short of food, the cook served us a wonderful pot-roast of fresh meat—mountain sheep, he had said. Later we found we had eaten wild burro; but we liked it so well that we shot and ate two more before leaving the canyon.

At Separation Rapid, so named because the famous Powell party of 1869 had separated there, the passengers were not allowed to ride through the rapid. As the only passenger on the previous trip, I had been compelled to find a way around, for, by accident, I had been left behind. Now I found myself with the problem of guiding the two government men in the sounding party over my previous route. This lay along a narrowing ledge 350 feet above the water, to a face climb down to the head of a chimney. Down the chimney, 250 feet below, on a sandy beach, was half of a boat—perhaps all that remained of one of several river parties which have disappeared.

We had little time for contemplation of that or of our still active boats plunging below as we started the traverse of another ledge which led us at right angles out to a shelf. Before we had come to anything really exciting one of the men was talking about "these here pants places." Upon inquiry, I learned that a "pants place" was a place where you could look down your pants leg and see the river below! These remarks he made while he still had two footholds to stand in; he ran out of such apt expressions later on, especially on the 200-foot rope descent.

On our second trip we had an additional boat. My previous experience as an amateur sailor and the knowledge I had acquired about the rapids so impressed the head boatman that I was put in charge of the new boat in place of the man who was to join us.

Of all the sixty-odd rapids we ran, Mile-239 Rapid is especially memorable to me. It was my first difficult rapid. Early in the morning of the second day out we pulled into shore to look it over. I remembered it well; for one night, on the first trip, when Woody and I were lost we had slept on a sand bar beside it. It looked even more dangerous in the daylight than it had in the gloom of that other evening, a month before. The idea, I was told by old

Dodger, our excellent head boatman, was to enter very high on the left of the V, continue rowing toward the shore so as to miss a seven-foot hole, or sweep, formed between huge sunken rocks, float with the current for a hundred yards before pulling to the right past a jutting point of rock, at the same time turning to catch a surge from a right-angle wall in a chute that would gush the boat out into the calm water below. That was the only way to leave the rapid; all the other chutes were so narrow that they would hold a boat, and probably the boatman, forever. Any upset in the upper portion would pin the boatman against these rocks. A life-preserver was useless in such a rapid. All I had to do was to take a seventeen-foot, one-ton boat through those seven-foot waves, racing at fifteen to twenty miles an hour, using nothing but oars for power.

I watched Dodger swing out into the current, swiftly accelerate as he neared the breaker wave, and then smash into it, stern first, on his way into the thick of it. Owen went over next with the cook boat. It was my turn; Spenc followed me. The whole secret of this rapid, I knew, was not to hit the first hole, but I misjudged the set of the current and the stern hit the edge of it. The boat whirled around, the port rail dipped brown cold water into the cock-pit, and I knew I was headed squarely for the second hole, which was so far off the course Dodger had not even considered it. With water already slopping over my feet, I feared the boat could not stand another plunge. Suddenly, the boat bumped a hidden rock and pivoted about. When a surge took it off, I was headed away from the hole and rowing frantically for the main current. Caught safely in it, I whizzed by the jutting point of rock so closely that I had to ship an oar to avoid breaking it. The final test was upon me. Somehow I coasted uphill on a huge surge to within a foot of the right-angle wall and then shot down into the lagoon. Old Dodger, quite out of sight of the upper portion of the rapid, sat in his boat and watched my perfect exit with an approving eye. He knew how to pick a good boatman, all right!

With the first of December and the prospect of Christmas in the Grand Canyon, the trip began to drag. We were far behind schedule, and an icy up-river wind chilled us. Frequent rainstorms deluged us, and peels of thunder seemed about to bring the walls down upon us. On Thanksgiving Day we had eaten a fresh donkey—"Colorado turkey," we called it. My birthday came, and with it a wonderful

three-layer chocolate cake, the product of Owen's genius with a fourteen-inch dutch oven. The boys grew lonesome and kept me busy with radio messages. I made a record by getting a message to Sierra Club friends in Berkeley five minutes after I had sent it.

One night, after supper, Woody told us we were through with the surveying. We celebrated by sending off all our rockets, flares, and distress signals. A pile of life-preservers caught fire and smoldered all night, but we left them in a heap as we piled things into the boats the next morning. About noon we came out into the open country and the bluer waters of the lake and rowed across to Pierce's Ferry, where our friends had come out to greet us.

CAMPING ON THE EQUATOR

By Ynes Mexia

ECUADOR, the Land of the Equator! There my life-long shadow would dog my step no longer, but, vanquished, would grovel beneath my feet. At last I would stand on the earth's great belt, nearest the beneficent sun. But would it be beneficent, or would it strike me down with its invisible power or burn me with its intense rays?

Such the dreams as the good Grace ships carried me swiftly in September of nineteen hundred and thirty-four over seas ever bluer and with breezes ever warmer.

Guayaquil is certainly sufficiently warm, though in the months of our northern autumn not hot enough to be uncomfortable. The houses are mostly built of cane, often thatched with palm fronds, with wide jalousie-shaded windows to shut out the sun, except in the business portion of the city, where substantial but unromantic concrete buildings are the rule. On the coastal plain of Ecuador, on which Guayaquil is situated, all manner of tropical products flourish. Bananas are the staple food of rich and poor alike, and great rafts of balsawood and dugouts float down the rivers, piled high with huge bunches of the green fruit. Vast plantations of cacao, alas! much decimated by the dreaded Witches'-broom, extend along the plain; cocoanut palms fringe the waterfronts, and other tropical fruits grow inland.

On arrival, I took the train to Quito, the Ecuadorian capital. After crossing the plain with its luxuriant vegetation, the climb begins. Abruptly the humidity diminishes, so the mountain-slopes show little of native growth. To reach the high Andean plateau the train hoists itself by switching back and forth up the almost perpendicular rocky front of the Devil's-Nose, *El Nariz del Diablo*, and comes to rest in the elevated valley and town of Riobamba, famed for its strawberries and other fruits of northern climes. Here the night is passed, and the next morning the train continues northward over the Páramo along the "Andean Boulevard," lined on either side with majestic snow-crowned volcanos. Arriving at Quito, the highest capital in the world, at some ten thousand feet, I presented my credentials and established headquarters.

Ecuador lies in three well marked zones: the hot, low-lying coastal plain with its alternating wet and dry seasons; the mountainous region of high *páramos* and elevated peaks with but scanty rainfall; and, to the east, the *Oriente* or the Ecuadorian portion of the far-reaching Amazon Basin, clothed with magnificent, ever-wet forests and watered by great rivers. I planned for excursions to the different zones.

One of my expeditions was to take me to the northern border of Ecuador, so, taking the train going northwards from Quito, I finally passed the anticipated Line of the Equator wrapped as tightly as possible in my coat and viewing with interest the snowy peak of the Volcan de Cayumbe (19,500 feet). Ecuador, like Africa, has marked her equator with a snowy peak pointing towards the sun. On this particular trip I was on the trail of a certain Wax Palm, said by early travelers to grow on the Volcan de Chiles, one of the lesser peaks over whose crest runs the boundary line between Ecuador and Colombia. The sketches and description show it to be a tall, slender-trunked palm, sometimes reaching 200 feet in height, the stem covered with a whitish wax-like substance. Its great interest to us lies in the fact that it is said to grow at greater altitudes and to endure greater cold than any other known palm, hence more adaptable to our California climate. The locality had been given as only "Volcan de Chiles," so it was up to me to find it.

The railroad went no farther than Ibarra, where a letter of introduction brought me much assistance from Mr. Tamayo. From there an automobile took me, Palma, my faithful helper, and my equipment to the little town of Ángel (misnamed), where I had my first experience of the cold of the high Páramo. A side trip to lower levels took me on a search for Cinchonas, or quinine-bark trees, then on to Tulcan, the border town of northern Ecuador. I carried a letter to Señor Augusto del Hierro, the customs officer, a tall, severe gentleman who later thawed out and became most genial. To him I explained my pressing need for Wax Palms. He informed me that the Volcan de Chiles was a snow-peak, that the upper reaches consisted only of rocks covered with eternal snow and ice, that below this extended the Páramo, which was far above tree-line, and that if I wanted trees of any description I would have to circle the mountain to the north along the Páramo belt and on the eastern side drop down to tree-level, where possibly that palm might be

found. This sounded reasonable, so I requested the means of transportation. There was difficulty in securing horses and a guide for the trip, but after several days' search an *arriero,* or packer, with two saddle- and two pack-animals was found, who said he had been over the trail some years before. He claimed it was a terrible trail, and he was right!

The next morning Palma and I were ready by seven o'clock, but along came the animals about eleven, and in three hours we reached the little village of Tofiño, close to Chiles, where we made a hasty cold lunch. Here José, the *arriero,* insisted that we pass the night, as he said there was no shelter farther along. To this I vehemently objected, for surely a three hours' ride was not a day's journey. Finally, I rode on, driving the pack horses so that José and his son followed perforce. After all it was a bluff on my part, for I did not know the way; but it worked! Soon the trail dipped to a deep, boggy hollow and we had a taste of what was to follow. Riders and packs had to come off and while the horses wallowed through the ooze the loads were carried across by the men and the animals repacked. It was drizzling, with a cold, biting wind, regular "*paramo*" weather, on that mountain-side, and José insisted we would have to spend the night up there, so at dusk we came to a stop on the wet, bleak upland. The only vegetation consisted of the coarse Páramo grass and Frailejones, tall, woolly-leaved thick-stemmed composites, and of these José said he could make some kind of a shelter after he unpacked the horses and staked them out.

A more dreary campsite I have never seen. The ground was boggy and very wet underfoot, yet there was no available water, no shelter, and, of course, no wood. The drizzle settled down into a cold rain while José and his son cut some of the tall Frailejones and piled them into a clumsy windbreak, then sat down, supperless, in the cold and wet to shiver the long night through.

"But," I objected, dismayed, "we can't stay out in the rain all night at this altitude; we will all be frozen or sick from exposure with no shelter."

No, there was nothing to do about it, they gloomily insisted.

Well, I thought of a lot of things to do, and that speedily. The old man would not turn a hand, just sat hunched up shivering in his poncho, but Palma and the boy hustled under my orders, stretching a pack-rope between some tall Frailejones, making a sort of fly

out of my two blessed "alligator-skin" ponchos, filling in the holes in the windbreak, putting less-damp Frailejon leaves as mitigators of the wet ground underfoot, and getting my cot up under the improvised shelter. It continued to rain steadily and the wind whistled and snatched at the frail fly which, though it did not leak, was rather inadequate. Finished, the old man moved in.

Hot food seemed the next desideratum, but the Frailejones were all dripping wet, and Palma and the boy wrestled for an hour trying to coax a blaze, while I prowled around in the dark and rain hunting for the undermost, drier leaves. Finally, with many matches and bits of our precious candle, a faint blaze was nursed to life. There was a little water in my canteen, and in that we heated some boiled potatoes and some of the familiar pea-soup powder that luckily I had along; and did it taste good! I crawled into my cot, Palma lay down on a pack-cover, and the two men huddled up beside him. The rain pattered fitfully on the taut "alligators," and we slept, doubtless the only human beings on that vast Páramo.

In the chill, overcast morning the old man complained that he had slept under a drip all night, but I did not care; why didn't he get up and fix it? There was no hope of a fire, so we ate some cold bread and saddled up (luckily the animals had not broken loose) glad of the exercise to warm up.

As we picked our way, for trail there was none, the horses slipped and plunged and went down in the Alpine bogs along the steep hillsides. Horses and riders were soon covered with mud. We slithered along for hours. We were working along the north face of the mountain, in Colombian territory, but never a glimpse did we get of old Chile's snowcap, for he had wrapped himself in his customary cloud-blanket, through which we were groping our way. In the late morning we came to the steepest ascent of all and, climbing upwards through the drizzle, came to a cleft at the crest called the Portazuelo, which let us through to the descent beyond.

Cutting through the Portazuelo we commenced a terrifically steep descent—how the men got those horses down I do not know. The trail has been used by the Indians for centuries and is worn down until it is a miniature box canyon ten to twenty feet deep. Of course a stream has appropriated this inviting, ready-made bed, and there are small waterfalls and boulders in the course. Riding was not to be thought of, and Palma and I jumped from tussock to tussock of

grass or slid into the boggy ground, collecting a few plants as we went, until a valley opened out between the stark hills, and our eyes were gladdened by some gleams of sunshine. Not far away was a little mud hut, called the Tambo, which we reached at two o'clock. There, the women made us some hot soup and boiled some potatoes, their only crop, and, believe me, it went to the right spot.

Again disregarding José's pleas that we "call it a day," we rode on down the valley, now with only occasional boggy places, and about five o'clock reached another adobe hut, just below tree-line, where *aguardiente* was sold and a lot of drunken natives were shouting. This time José was sure we could go no farther, but I pushed him along and as the afternoon advanced he really got a move on. The trail was wide and well marked, but crossed with *camellones*, the wash-board-like humps and depressions that form in the soft muck of Andean trails. Each animal puts his feet in the tracks of his predecessors, and deep grooves are formed, filled with mud and water and with rounded ridges between them. It was the first experience of my young horse with this phenomenon and he did not like the deep holes. He tried to walk on the humps, from which he slid, or else insisted on crowding up to the banks, where overhanging branches worked havoc with the rider. It grew rapidly warmer as we descended, and the forest thickened. We collected as we went. It was not until after dark that we reached a bamboo hut in a warm, pleasant valley, where we happily camped. Next morning we went on to the hamlet of Myasquer, where we had been told the coveted palm might be found.

Myasquer was a disappointment. The natives were stupid and would not guide us or help our search, so, perforce, we continued in a now beautiful forest, recrossing the line into Ecuador, to a house in a deep, watered valley, where a friend of José lived. One Wax Palm, or *Palma Real*, as it is called here, we saw, but it was on an inaccessible cliff overhanging the river. Such a disappointment!

José's friend received us hospitably, as the natives usually do, and when approached on the subject of Wax Palms, said he knew of but one and that it was half a day distant by rough trail. He finally agreed to guide us to it, so the next day we started, but not as early as I could have wished.

That trail! It went up the side of a mountain so steep that in places I had to be hauled up, and then through choked forests and

along precipitous slopes, apparently endless, where the sun shone tirelessly. Our progress must have been under a mile an hour, but eventually we rounded a spur and from afar saw the beautiful palm, its slender trunk white against the dark forest and its spreading crown waving above the forest canopy. We reached it — a photograph—and with a pang (unfelt by my companions) I gave the order. The ax bit in, and the great tree crashed to earth.

Unluckily, it was not in fruit so no seeds were available, but at least it was in flower. I photographed the great spathe and flower-cluster, so heavy the two men could hardly lift it; made measurements and notes; and took portions of the great arching fronds. Then we started on the long journey back, arriving after dark, very tired, very hot, very dirty, but very happy that the long quest had at least produced the desired herbarium specimens of this little-known palm tree.

That evening, after being fed, a bath seemed the most desirable thing in the world; but the only available water was a small pool directly in front of the house and bathing suits were far away. As it was dark, the difficulty was solved by the owner herding the family to the back premises while I gratefully waded in. Unluckily for my peace of mind the numerous and rather ugly dogs discovered the queer white apparition in their home-pool and threatened to eat it up.

The next day we started on the return journey, collecting along the way. By good luck, not far from the trail, well up towards timberline, I found some desired Cinchonas. Late in the afternoon we had climbed to the lower reaches of the Páramo, where the trees had dwindled to shrubs and where tempting blueberries grew abundantly, much as they do in Alaska; so as I rode along I snatched handfuls of them and ate them. Presently I began to feel sick and dizzy and wondered whether the altitude was affecting me, although I had not felt it before. Reaching the little Tambo at dusk, I nearly fell off my horse and violent chills and pains assailed me. The kindly natives declared that I had eaten poisonous berries instead of blueberries and they dosed me with molasses-water, which I was too ill to resist. The much-frightened Palma carried me to my cot, but of course doctors and drugs were days away. As the chills and pains increased, a chicken was chased, a feather extracted and, unwashed, was poked down my choking throat. After repeated appli-

cations of this homely remedy I lost those berries and everything else besides, and gradually the pains subsided. Later I was told that children are often poisoned, sometimes fatally, from eating the berries, but soon learn to distinguish them from the harmless ones. Next morning, to my relief, I was all right again.

We wallowed back along the flanks of old Chiles in a driving rain. The horse Palma was riding slipped and went down, but he leaped nimbly to safety as it fell. The horse rolled over into a hollow with all four feet in the air, whence it was extracted with difficulty. Without further accidents we reached the little village of Tofiño, and, as I had had all I wanted of that particular volcano and the road was good and the moon full, Palma and I rode on to the town of Tulcan, where we arrived rather late.

The next three days were very busy ones, pressing, drying and caring for the plants. On August 7, 1935, about three o'clock in the morning, a series of earthquake shocks occurred, the last one quite severe. The walls began to creak and the plaster to fall, so I dressed hastily and went out to the central Plaza with Palma, where we found that most of the inhabitants had preceded us. It was very cold at that altitude in the early morning and most of them were wrapped in blankets or ponchos, they did not seem very much frightened. Farther north, in Pasta, in southern Colombia, the earthquake damage was very severe.

From Tulcan I very greatly desired to go to another locality in Colombia from which Wax Palms had also been reported, to see if I could find them in seed. Time pressed, however, for I had to return to Quito and prepare to join Dr. Goodspeed in his University of California Botanical Expedition to the Andes in search of the Nicotianas, or wild tobaccos, which are native to the Andean highlands. So ended my quest for the Wax Palms.

SOME OTHER CLIMBING WORLDS

By Glen Dawson

CLIMBING is an international sport—similar technique is used everywhere, routes often cross the most sacred boundaries. The Japanese recently sent their first expedition to the Himalaya, and the Germans even send expeditions to the Soviet Union. During my recent *wanderjahr* I spent in all about four months in the mountains, including experiences in three widely separated and very different regions—North Wales, the Caucasus, and the Japanese Alps.

Those who are fortunate enough to climb in the Alps relegate the British rocks to mere practice; but what seemed strange to me, even those who become experts in British climbing and perhaps never see the Alps are inclined to accept the theory that it is only practice. The customary dampness, and British conservativeness, make nailed boots more popular than "rubbers." Beginners are advised to use boots first. Pitons are taboo. Climbing is a year round sport. My introduction to the Lake District, which will always be associated in my mind with damp clothes, was at Christmas. I camped a snowy Easter holiday in North Wales with David Shuter and Douglas Hewett. We left London by car and the same day made the Grooved Arête route on Tryfen. At first, climbing a rock when ten feet away there is an easy grass-chute seemed artificial, even when higher up the route becomes especially choice. From the maze of routes on Milestone Buttress, near the main highway, we chose the one called the "Super Direct." Idwal Slabs are deservedly popular. During the holiday period it is often necessary to wait in line on the ordinary route, a favorite for beginners. Nail-scratches clearly indicate, even from a distance, the three routes of Faith, Hope, and Charity. Our best climb on Idwal was "a severe"—the Tennis Shoe, first made by N. E. Odell. British climbs are loosely divided into easys, moderates, difficults, very difficults, severes, and very severes. I led very difficults comfortably, but kept a healthy respect for severes.

From British climbs to the Caucasus is a big jump, though the ascent of Mount Elbrus (18,470 feet), the highest peak in Europe, is not difficult. Personally I prefer rock-climbing to mountaineering, but it was natural that during my two months in the Soviet

Union I found myself in the Caucasus. For nearly two weeks I was in Dagestan, in the eastern Caucasus, where automobiles, electricity, schools, and hospitals are just being introduced into a medieval civilization. An almost continuous cloud prevented me from seeing the mountains, much less climbing them. Let no one complain of High Sierra weather. The best center for a short visit is, however, in the west, at the pleasant Intourist Hotel at Adel-Su, reached by automobile from Nalchik. I arrived in early June, definitely out of season even for Elbrus, and waited a week at the 14,000-foot meteorological station with a non-English speaking Communist, without getting suitable weather conditions to go to the top. I was told that in 1933 only eleven persons climbed Mount Elbrus, but in 1935 the number was about two thousand. There is a vast scheme of training and instruction, so that thousands of workers, students, and peasants are given an opportunity to go on big mountains. I visited a school for instructors, gloriously situated in trees below magnificent snow and ice peaks. After a month's early season school, this group, which includes Austrians and native Balkars, as well as Russians, instructs others and leads climbing parties. Three grades of badges are given for mountain climbing: the easiest for a peak over 5000 meters—nearly always Elbrus or Kasbek; the harder ones for service as instructor, for climbing five peaks, and for other qualifications; those of the third grade are given special badges for notable ascents, such as Ushba, and climbs in the Pamir. The Soviet government is encouraging the interest in mountaineering. The emphasis has been on mass ascents; in Britain and Japan climbing tends to be unorganized.

By the time I had crossed Siberia and had arrived in Japan, it was the middle of July and the season was ideal for climbing. Rock-climbing in the Japanese Alps is not extensive and the rock is unsound. However, the luxuriant vegetation—a vivid green, in startling contrast to the snow-fields—and, most of all, the people themselves, made my visit to the Japanese Alps a delightful experience. The best starting point is Kamikochi (5000 feet), one day from Tokyo, by train to Matsumoto, thence by bus up a rugged canyon. Mount Yari and the Hodaka group, more than ten thousand feet elevation, are the objectives of the climber. On the shoulder of Yari and between Oku Hodaka and North Hodaka are huts where food and accommodation may be had; either hut may be reached in

one day from Kamikochi. The day's ridge-trip between the two huts does not require the use of a rope although there is a good deal of climbing at the Hodaka end. My climbing companion was Junji Kanayama of the Japanese Alpine Club. For two nights we were guests of the Keio University Alpine Club in their camp in Karasawa. Rice three meals a day simplifies the commissary. Our first climb was the moderately difficult North Ridge of Mae Hodaka. Climbing and skiing are very popular in Japan; a half dozen well equipped student parties from the rocky Karasawa camps were on the route at the same time. There is a shorter but more difficult climb a few minutes from the hut, on the shoulder of Mount Yari, the splendid big pinnacle of Ko-Yari. The first of the two pitches is sensational, but the holds are good. We borrowed a rope from the hut and after Ko-Yari went up an interesting ridge from Ko-Yari to the summit of Mount Yari. The same day we went to the Hodaka Hut. Our best climb was the Fourth Ridge on the great west face of North Hodaka. We had to go down a long rocky chute to the base of the route and then climb back up, four hours of very difficult climbing. A couple of carabiniers are comforting, although not essential. Kanayama went back to Tokyo, so I went up Fujiyama by myself. In the Japanese Alps one sees students, but on the great national volcano are religious pilgrims and the more uneducated. The Sunday following my ascent 11,300 persons were on top in a single 24-hour period. I went up the Yoshida side of Fujiyama, spent the night in a one-room "hotel" on top, and the next morning ran down the cinder slopes on the Gotemba side. On 12,395-foot Fujiyama it is inspiring to see so many climbers.

After having climbed in a dozen different countries I can agree with John Muir and Clarence King that our own High Sierra is the finest and most friendly of all. I hope that we of the Sierra Club will continue to do our part in the development of a spirit of an international brotherhood of climbers.

By Ansel Adams

SNAGTOOTH RIDGE, CASCADE RANGE

By Hermann F. Ulrichs

WESTERLY VIEW FROM SILVER MOUNTAIN, CASCADE RANGE
By Hermann F. Ulrichs

MOUNT FORMIDABLE, CASCADE RANGE
By Dwight Watson, Seattle

BOSTON GLACIER, FROM MOUNT BUCKNER, CASCADE RANGE

By Hermann F. Ulrichs

WAX PALM

By Ynez Mexia

BOSTON GLACIER, FROM MOUNT BUCKNER, CASCADE RANGE

By Hermann F. Ulrichs

FOOT OF THE PRACTICE SLOPE NEAR CLAIR TAPPAAN LODGE

By Richard G. Johnson

SKI-TERRAIN NEAR NORDEN

By Lewis F. Clark

PORTRAIT OF A FRIEND

By Henry E. Timby

SIERRA CLUB

Founded 1892

MILLS TOWER, SAN FRANCISCO, CALIFORNIA

THE PURPOSES OF THE CLUB ARE: *To explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; to enlist the support and co-operation of the people and the Government in preserving the forests and other natural features of the Sierra Nevada.*

JOHN MUIR, President 1892 to 1914

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THE SIERRA CLUB

What It Has Done and What It Stands For

Those who appreciate the mountains, the forests, and the influence they have, both as centers of recreation and as founts of inspiration and makers of character, are welcome to become members of the Sierra Club.

It is not necessary to be a mountaineer in the physical or athletic sense, to be eligible for Club membership. There are no physical tests or prerequisites. The Club exists primarily for the purpose of safeguarding those natural scenic resources which growth of population ever endangers. To explore the mountains is the joyous privilege of all who can; but to assist in the preservation of their glories is both a privilege and a duty of conscientious citizens.

The Sierra Club was organized in 1892. John Muir, great mountaineer, scientist, author, and leader in the national park movement, was its first president and continued in that office until his death in 1914. Under his leadership, and since, the Club has ever given support to movements establishing national and state parks, urging legislation to protect natural scenic assets, resisting encroachments on the national parks and, in coöperation with the Save-the-Redwoods League and other organizations, seeking to preserve a fair portion of the California redwood stand.

Past achievements of the Club include furthering the original movements to set aside as Federal reserves the wonderlands now known as Yosemite and Sequoia national parks; exploring, mapping, and publishing reports on high mountain regions prior to their mapping by the United States Geological Survey; planning trails through the high mountains; and coöperating with the State of California, the several counties, and the Forest Service in building new trails, for which the club has given liberally of its own funds. The John Muir Trail, following the main crest of the Sierra from Yosemite to Mount Whitney, is a conception of the Club. The Club has coöperated with the California Fish and Game Commission in stocking many lakes and streams in the Sierra. The golden trout of the Mount Whitney region were widely spread in this way.

The Club's library at the headquarters in San Francisco contains a large collection of books, pamphlets, periodicals, and maps on mountaineering, exploration, natural history, geography, geology, botany, conservation, winter sports, and other subjects appropriate to the purposes of the Club. This library is available to the public for general reference.

Through the Frederick Hitchcock Morley Fund a collection of strikingly beautiful large photographs of the Alps, the Himalaya, and other mountain ranges, as well as of the Sierra, has been acquired. This collection is available to schools and societies for exhibition purposes. At the Club rooms there are also many other fine enlargements and photograph albums of mountain scenes.

Lodges and Shelter

The Club maintains eight lodges, for the benefit of campers and mountaineers:

1. Le Conte Memorial Lodge, in Yosemite Valley, where a library of outdoor books and an information bureau are maintained.

2. Parsons Memorial Lodge, at the Soda Springs on property controlled by the Club in Tuolumne Meadows, Yosemite National Park.

3. Muir Lodge, in Santa Anita Canyon, within easy reach of Los Angeles.

4. Shasta Alpine Lodge, at timberline on Mount Shasta, where, during the summer season, accommodations are provided for climbers.

5. Harwood Lodge, in San Antonio Canyon near Mount San Antonio, about fifty miles from Los Angeles.

6. Muir Shelter, at Muir Pass on the John Muir Trail, midway between Mount Whitney and Yosemite National Park.

7. Clair Tappaan Lodge, at Norden, on the State Highway, near Donner Pass, especially for winter sports, but used also in summer.

8. San Antonio Ski-hut, on Mount San Antonio.

Publications

The Club issues to its members a bimonthly publication under the title of *Sierra Club Bulletin*. The first number each year, in the form of a magazine, contains scientific, historical, and descriptive articles relating to the Sierra Nevada and other mountain ranges, records of interest to the Club members, and numerous illustrations. The other numbers during the year are devoted to matters of current information and notices to members. Special publications are issued from time to time. Those now available are Starr's "Guide to the John Muir Trail," Farquhar's "Place Names of the High Sierra," and Le Conte's "Ramblings." A complete list of the Club's publications was printed in the magazine number of the *Sierra Club Bulletin* for 1934.

Outings

The Club has for many years conducted annual outings into the High Sierra with occasional expeditions to other sections of the West. About two hundred Club members participate in these interesting high-mountain trips, which occupy a month in mid-summer. Members of other mountaineering and outdoor clubs are welcome. The 1937 outing will be held in Glacier National Park, Montana, with a week in the Canadian Rockies and the Selkirks. Further information may be obtained from the Secretary. Shorter outings are organized occasionally by the respective chapters.

Other Activities

Winter sports, including skiing and winter mountaineering, are actively engaged in during the season.

Rock-climbing practice is held, under instruction and guidance of skillful leaders, preparatory for the more difficult climbs in the Sierra.

Chapters

For the purpose of conducting local activities, such as week-end trips, lectures, and social events, designed to promote acquaintance with the Club's major purposes, chapters are provided for in the By-Laws. Chapters now organized are: Southern California, Riverside, San Francisco Bay, and Loma Prieta. Schedules of chapter events may be obtained from the respective chairmen or secretaries, or from the general headquarters of the Club.

NOTES AND CORRESPONDENCE

William E. Colby's Services as Chairman of the California State Park Commission *

By Duncan McDuffie

Nine years ago I had the honor of transmitting a message from the Governor of California, C. C. Young, to a member of the Sierra Club. Because of this man's long and successful service in the cause of conservation and because of his intimate acquaintance with the natural resources of the State, the Governor had selected him from a list of distinguished Californians as the one best fitted to build a state park system. You do not need to be told that the man Governor Young wished to draft into state service was William E. Colby.

The message reached Colby when he was in the Kern River country with the summer outing party of the Sierra Club, and his decision was made there. He had every right to decline—he had honors in plenty, he had done more than his share of public service, to accept would involve great personal sacrifice of time, energy and income. Yet he undertook the task.

I like to think he was inspired to do so by the magnificent region of the Sierra in which he then was—an area recently preserved to the nation by its addition to Sequoia National Park largely through the efforts of the Sierra Club under Colby's leadership. I am sure, at least, that the need of preserving in like manner the outstanding scenic and recreational areas of his own state was a challenge he felt bound to accept.

In 1927 Colby became the first member and the first chairman of California's first State Park Commission. While the membership of the Commission has seen many changes in the meantime, he has served continuously as chairman and has from the beginning been its leader and its unifying force. He was supported by a sympathetic and helpful state administration. He was aided by an enabling act skillfully drawn by Newton Drury and a committee of the Save-the-Redwoods League. But he had only a handful of parks to administer and no money to buy more. If California was to have a park system representative of its landscape and historic treasures and adequately serving the recreational needs of its people, it had to build from the ground up, and it was upon Chairman Colby that the major burden of building such a park system fell. The results prove he built with vision, with intelligence, and with constructive genius.

His first step was to surround himself with able men. Colonel Charles B. Wing, of Stanford, whose ability as an administrator had been shown in Big Basin, was made Chief of Parks, in which capacity he established a devoted and able administrative personnel. Frederick Law Olmsted, the country's foremost park authority, was engaged to make a survey of the State's park and recreational resources. The report which he wrote has not only guided the Park Commission in its selection of park areas, but has become the authoritative statement on park qualities, values and purposes for the country

* Read at the annual dinner of the Sierra Club, San Francisco, December 12, 1936.

as a whole. The next step was to submit a bond issue of six million dollars for the purchase of park lands, which was overwhelmingly approved by popular vote in 1928. And finally the delicate task of investigation and negotiation was assigned to Newton Drury, whose competence had been amply demonstrated by his work of a similar nature for the Save-the-Redwoods League.

The slow, painstaking and onerous task of selection and purchase was begun by Colby and his associates and assistants in 1929. It was not completed until this year. The accomplishment of those seven years is amazing. The fourteen parks and monuments which made up the system when Colby took hold have grown to seventy; their acreage has been increased in seven years from 14,000 to 293,000; their value has grown from one million dollars to fifteen million dollars.

They star the map of California from the redwoods of Del Norte to the Silver Strand below Coronado. They were selected with an eye both to individual merit and to their place in a system designed to serve every portion of the State. The names of a few will show their varied character and their unmatchable quality—The Bull Creek Redwood Forest, Point Lobos State Reserve, San Juan Bautista, Calaveras Big Trees, Sea Cliff and New Brighton beaches, Mount San Jacinto, Morro Bay, Cuyamaca, Mount Diablo, Pfeiffer Redwood Park on the Big Sur, Borego Desert Park—and may serve to recall that many of these precious areas escaped spoliation only through Colby's personal interest and efforts.

These areas and two score others were incorporated during Colby's chairmanship of the State Park Commission in what no less an authority than John C. Merriam has singled out as "the outstanding state park system in the United States."

Last month, the challenge fully met, the obstacles overcome, the park system built, the standards of administration set up, Colby, his release earned, resigned his membership in the State Park Commission and returned to a private life still rich in opportunities for service to the cause of conservation. His reward is the respect, affection and gratitude of the millions of Californians who find spiritual and physical well-being in their state parks—his imperishable monument, the areas he has preserved for the use and enjoyment of this and coming generations of men.

* * *

Refuge

High above Lake Florence, on a trail at the top of a mountain pass in the High Sierra, is a tiny hut open to any stranded wayfarers who have failed to make camp by nightfall, who have been caught in a mountain storm, or who otherwise need shelter for the night.

Around the room are wide benches which can be used for beds; and a large fireplace with a generous supply of logs adds a homey touch to the isolated refuge. Not only shelter and warmth are provided, but a few staples of food are to be found in tins on the shelves of the hut. A brief card extending hospitality to all who may need it, also offers the suggestion that more fortunate

ones packing over the trail may, if they so desire, leave some article of food or equipment which they can spare from their supplies.

Some thoughtful person has provided several large candles. The wood is recruited in much the same way. Lower down on the trail is a sign indicating the end of the timber line and requesting that those who can, carry a few logs with them to supply the hut.

That the refuge, built by nature lovers in memory of John Muir, the great American naturalist who loved and explored this mountainous country, has been a source of help and comfort and enjoyment to many who have traveled over the John Muir Trail, is attested by the Log, wherein are written words of gratitude and of commentary by those who have availed themselves of the hospitality offered by "Muir Hut."

—*The Christian Science Monitor,* October 10, 1936

MEMORIALS

Harriet Monroe, 1860-1936

By William E. Colby

The many friends of Harriet Monroe will, I know, appreciate information as to her death, which occurred in Peru, September 26, 1936. Miss Monroe went with the Sierra Club on several of its early outings. She was most enthusiastic in her fondness for the Sierra and wrote several beautiful poems as a result of this inspiration. On the 1908 outing she wrote a poetic idyl, having for its main thought the friendliness of all out-door life toward John Muir, who was also with the Club on that trip. This was enacted at the campfire one never-to-be-forgotten night and John Muir was induced, very much against his wishes, to take part in the out-of-door drama. Miss Monroe was a strong supporter of what the Sierra Club was endeavoring to accomplish and appeared before committees in Congress to urge important measures. In 1912 she inaugurated publication of the *Poetry* magazine in Chicago, the city in which she was born and lived. Many predicted failure, but *Poetry* has become one of the outstanding publications of verse and has survived all these years. Much has been written in eulogy of her full life, but the opening lines of "Requiem for H. M." by John Gould Fletcher seem most appropriate to us of the Sierra Club:

> Where rise the mountains, condor-haunted,
> To this height,
> In a far land, by death undaunted,
> She has slipped away to night.

* * *

Cornelius Beach Bradley

Professor Cornelius Beach Bradley passed away in Berkeley, February 18, 1936, at the age of ninety-three. He came to the University of California in 1882 as an instructor in English and retired in 1911 as professor emeritus. He was born in Siam, son of a Congregationalist missionary, and, in 1871, returned to that country for a few years as a missionary, himself. He held degrees from Oberlin College and Yale.

Professor Bradley was not only a charter member of the Sierra Club, but was one of the twenty-seven who signed the articles of incorporation on June 4, 1892. He served as a director of the Club until 1902, and was Editor of the *Sierra Club Bulletin* from 1895 to 1897. He was also Treasurer for a year. In 1898 he visited the headwaters of Bubbs Creek with a party of friends who, over his protest, named one of the peaks above Center Basin "Mount Bradley." The party later made the arduous crossing of Harrison Pass. The experiences of the party are described by Professor Bradley in the *Sierra Club Bulletin* (1899, 2:5, pp. 270-277). In an earlier number (1896, 1:8, pp. 314-324) he gives an account of a knapsack trip along the Sierra crest from Donner Pass

to the Dardanelles and an itinerary for another trip to the north. Other contributions to the *Bulletin* were: "Stevenson and California" (1911, 8:2, pp. 110-117); "A Reference List to John Muir's Newspaper Articles" (1916, 10:1, pp. 55-59); "The Junipers of Lake Valley" (1918, 10:3, pp. 293-303).

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Edward Curtis Franklin

Among the many distinguished men of science who have given generously of their time and thought to the advancement of the Sierra Club and its activities was Professor Edward Curtis Franklin. From 1909 to 1914, with the intermission of a year, he served on the Board of Directors of the Club. He retained his interest for many years thereafter, although other demands upon his time prevented his further service. In April 1928, learning of the 14,000-foot certificates, he sent in a request for one with the following list of peaks climbed: Longs Peak, Grays Peak, Mount Whitney, Mount Shasta, and Mount Rainier.

Professor Franklin's scientific achievements were in the field of chemistry and physics. He joined the faculty of Stanford University in 1903 and retired in 1929. He was one time president, respectively, of the National Academy of Sciences, the American Philosophical Society, and the American Academy of Arts and Sciences. He was born in Kansas, in 1862, and passed away at his home in Palo Alto, February 13, 1937.

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Lieutenant-Colonel Lewis Foerster

By N. F. McClure, *Brigadier General, U. S. A., Retired*

Members of the Sierra Club who knew Colonel Foerster will miss his genial presence on their outings. On December 21, 1936, he passed away, and on December 26 was buried with full military honors at Vancouver Barracks, State of Washington.

Lewis Foerster was born in Germany, February 16, 1868. While he was still a boy, his family emigrated to the United States and settled in Oregon. At the early age of eighteen he enlisted in the United States Army. His first assignment was to Company H, Fourteenth Infantry, and he had belonged to it only a year when a young lieutenant, Charles H. Martin, became his company commander. By a curious freak of fate, when Lieutenant-Colonel Foerster died, fifty years later, Major General Martin was Governor of Oregon, his home state.

After serving one enlistment in Company H, young Foerster re-enlisted for the Cavalry and was assigned to Troop K, Fourth Cavalry. He was soon made a corporal, and in that capacity served with his troop in General Grant National Park, in 1894, and in Yosemite National Park, in 1895. In the policing of these wonderful recreation grounds, his service was outstanding, and it was in recognition of his achievements and because of his close association with the particular region, that I gave his name to a prominent peak on the park boundary and placed it on the map that I was then pre-

paring. The experience of those years led him at a later date to join the Sierra Club and after his retirement he took part in several of the Club's summer outings. More than once, at campfires, he told how he and his comrades had kept the sheep and cattle out of the parks in the days when such trespassing threatened to destroy the purposes of the parks. He was also a member of the Mazamas. It was the fortune of Troop K to be among the first organizations to go to the Philippine Islands in 1898, and Foerster was present when, on August 13, Manila surrendered to the American forces commanded by General Merritt. A year later, Foerster was commissioned in the Volunteers, and in 1901, while still in the Philippines, he was appointed a first lieutenant in the Fifth Cavalry. From that time his rise was rapid, culminating in a temporary lieutenant-colonelcy, August 5, 1917. Although after the World War he reverted to his rank of major in the Regular Army, he soon reached his promotion to permanent rank as lieutenant-colonel. He was retired with that rank, September 1, 1922, after thirty-six years of service. For the last fourteen years of his life Colonel Foerster lived in Portland, Oregon. He married more than thirty years ago. Mrs. Foerster survives him.

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George Prescott Vance

In May, 1933, the Directors of the Sierra Club elected George P. Vance an honorary member in recognition of his many years of assistance to the Club as proofreader for the printers of the *Bulletin*. This assistance was much more important than one might suppose from the mere mention of its character. In the first place, it extended throughout the whole period of the Club's history up to the time of his retirement two years ago, for Mr. Vance supervised the printing of the very first number of the *Bulletin*, in 1893, and had a part in the production of all but a very few numbers thereafter. In this connection, it may be observed that the printing of the *Sierra Club Bulletin* has had a remarkably consistent history; from 1893 to 1915 it was printed by Charles A. Murdock, and since that time by Taylor & Taylor.

George Prescott Vance was born on a farm in New Brunswick, September 16, 1851. He came to Humboldt County, California, in 1865 and shortly thereafter began his career in the printing trade. After a variety of experiences in western newspaper composing-rooms, about 1887 he entered the employ of Murdock, with whom he remained, with but a short intermission, until he went to work for Taylor & Taylor. He died in Oakland, December 20, 1936. In a recently printed biographical sketch, George L. Harding says of George Vance:

> His knowledge of the English language was thorough and his acquaintance with its literature extensive. No reader was ever a better grammarian or had a better sense for spotting a misquotation. . . . At Taylor & Taylor's all manuscripts first passed under his scrutiny and it was he who brought to the work uniformity in style of capitalization, punctuation, and spelling. Statements of fact he also checked and if the reference works at hand could not give them to him he would quietly put on his hat and disappear, to return shortly from a nearby library armed with the necessary authority.

MOUNTAINEERING NOTES

Mountaineering on the 1936 Outing

By Kenneth May

The region visited by last summer's outing presented a well balanced diet of Sierran mountaineering. There were seven 14,000-foot peaks for high altitude collectors, innumerable easily gainted vantage points for the view-specialists, a few first ascents for those who cared, and many more difficult climbs, new routes, and unclimbed pinnacles than anyone could do in a summer. Most of the last named were saved from conquest by the almost daily storms which dampened everything but the enthusiasm of the climbers.

All mountaineering activities were under the management of a committee which operated on the basis of two rules: 1—No solo climbing; 2—Climbers to report to the committee and sign the register on leaving and returning. Although participation in some climbs was restricted, interesting alternatives were offered, and on four occasions practice sessions were held for the benefit of both old and new climbers. There were some 575 "man-ascents" on 65 different peaks, pinnacles, or routes, including about 20 new climbs. A rough classification according to difficulty is as follows: Walks—6, Easy—43, Moderate—7, Difficult—8, Very Difficult—1. Registers were placed on 14,000-foot peaks not already having them and liberally sprinkled elsewhere. The committee was pleased by a safety record marred only by minor mishaps. However, the unblemished record of the roped parties, contrasted with the two or three near-accidents to members of the larger unroped parties, indicated that more attention should be given the latter. In particular, no matter how competent the leader is he must be given enough sub-leaders to help in controlling the party. Secondly, inexperienced climbers should be belayed on exposed places even when a fall does not seem likely. The carrying out of these precautions will probably mean smaller parties on moderate peaks in the future.

Lippincott.—Jules Eichorn led eighteen from Little Five Lakes on this "starter." *Kaweahs.*—The *Black Kaweah* was climbed by six knapsackers—Kenneth May, Leland Curtis, Dexter Richards; May Pridham, John Poindexter, Adele van Löben Sels—following the well-known route directly from the snow. The *Red Kaweah* was climbed by two of the knapsackers and five of a party of fourteen who attempted it en route to Moraine Lake. *Mount Kaweah* interested only five climbers the following day, but four more made first ascents of *Peak 13,291* and *Peak 13,186.*

Tyndall.—After two days of "valley-pounding," Morrey and Overhage led 23 climbers from Tyndall Meadow. Three other ascents were made during the following week. *Williamson.*—Four roped parties climbed by various routes the first day in Tyndall Meadow. *Barnard.*—Forty-six made this climb on the way to Crabtree Meadow or returning to Tyndall Meadow, and Marjory Farquhar led fifteen side-trippers from Wallace Creek.

Whitney.—From July 21 to 25 some 150 signatures were added to the register at all hours of the day and night. The Spectre of the Brocken (*S. C. B.*, 1936, 21:4, p. xx) disappointed several night parties although it had obliged Oliver Kehrlein only a few days before. The *East Face* was descended by Pridham and van Löben Sels July 23. The following day four parties (Eichorn, Richards, Virginia Adams; Clyde, Kehrlein, Carl Jensen; Pridham, Curtis; May, M. Farquhar, Poindexter) made the ascent with variations. The traverse was judged preferable to "shaky leg crack" which involves a two-man stand and pitons for safety. Motion pictures of the climb were taken by Marjory Farquhar.

Russell.—Two parties totaling 32 made the ascent by the usual route from the south, using belays on the final cracks leading to the summit ridge. Clyde led a new route up the arête to the west. *Muir*.—Thirteen reported climbing it, but probably more did so because of its accessibility from the trail.

Langley.—On July 23 endurance records were challenged by Lewis Clark, Milton Hildebrand, and Carl Jensen, who made the forty-mile roundtrip from Crabtree Meadow in less than 15 hours. Other climbs near Crabtree Meadow were *Guyot, Hitchcock, Tunnabora, Young, Peak 12,820* and *Peak 12,754*.

Milestone.—In spite of the rain, ascents were made every day of the club's stay at Milestone Creek. Altogether, 77 people reached the summit, 50 on July 29 under the leadership of Clyde and Kehrlein. A party scouted the pinnacles on the south ridge, climbed one of them, and reported the others worth a visit in better weather. *Ericsson*.—A party of twelve, reaching the ridge south of the summit, found the resulting traverse too slow. Clark and Jensen completed the climb, and the others returned to camp under the leadership of Tagliapietra. *Jordan*.—Two parties climbed the highest point, the interesting southernmost pinnacle, and found no previous record. A cairn was discovered on the northern summit, but intermediate points were not climbed. Other ascents from Milestone Creek were *Genevra, Thunder* (two parties), *Table* (three parties), and *Peak 12,673*.

Kern Ridge.—A party of three made first ascents of *Peak 11,153* and *Peak 11,804* on the way to the Kern-Kaweah. Another party climbed *Peak 12,749* (first ascent) and *Peak 12,808*. Both parties climbed *Peak 13,206*, finding a cairn but no other record. *Picket Guard*.—Pridham, Tagliapietra, van Löben Sels, and Jensen climbed the main peak, traversed the ridge, and finished the day with *Peak 13,332*, apparently all new climbs.

Triple Divide.—While the valley-pounders crossed Colby Pass, two parties climbed this peak. One reached camp via Miners Gap; the other, composed of Jensen and Gates, made a traverse of the ridge toward Colby Pass including peaks *12,660, 12,500* (first ascents), and peaks *12,740, 12,600*. Eichorn, May, and Tagliapietra had previously made the first ascent of the last named by an exhilarating traverse from the pass.

The Whaleback.—Pridham and van Löben Sels found no record of previous ascent. *Glacier Ridge*.—A party of four made the first ascent of *Peak 12,230* and of a difficult pinnacle. *Brewer* and *North Guard*.—Jensen, Poindexter, and Gates climbed these on July 4. The next day they made what appears to

be the first ascent of the *Sugarloaf* on the way to rejoin the main party at Deadman Canyon. *Big Bird Ridge.*—All points were climbed by a party of five led by Pridham. Only *Peak 11,600* had been climbed previously. Included in the first ascents was *Peak 11,874*. Another party traversed the ridge west of Big Bird Lake. While the main party crossed Elizabeth Pass, two climbers traversed from there to *Peak 11,874* along a very interesting overhanging glaciated ridge.

Two parties of die-hards spent the last day in climbing *Alta* and *Silliman*.

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Some Climbs in the Sierra, 1936

By William Rice

During August 1936 several members of the Rock Climbing Section of the Southern California Chapter made a number of interesting climbs in the High Sierra. A new route on the North Palisade was made—from Palisade Basin to the top of the "black waterfall" about three chutes north of the Le Conte route, traversing below an overhanging chimney to a chute to the right, thence directly to the summit. Several climbs were made in the Minarets, including a traverse from the Notch to Michael's and Clyde's minarets, with first ascents of Fourth and Fifth minarets. A descent of Disappearing Creek and the Enchanted Gorge was made. Those participating in some part of the trip were Mary Jane Edwards, Luella Young, Sophie Rice, Muir Dawson, Richard Jones, Nelson Nies, John Mendenhall, Robert MacConaghy, William Rice, and, from San Francisco, Torcom Bedayan. Some of the other peaks climbed were: Ritter, Goddard, Middle Palisade, Split Mountain, Thunderbolt (via the first chute north of the ridge dividing Upper Dusy Basin and Palisade Basin), the Three Teeth, the Doodad, and Cleaver and Blacksmith peaks.

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Rock-Climbing in Yosemite Valley

By Morgan Harris

Last season marked the fourth year of organized climbing in Yosemite Valley by the Rock Climbing Section of the San Francisco Bay Chapter. Numerous first ascents have been accomplished in that time, but the opportunities for new climbing are by no means exhausted. There are still many untried routes, while certain ascents first made in 1934 and 1935 have yet to be repeated. Most of the climbing last season was done on two scheduled trips, May 30-31, and October 10-11, 1936. The Southern California Chapter's Rock Climbing Section joined us on the May trip.

Washington Column.—Several ascents were made, all over the routes established by Leonard, Riegelhuth, and Harris on the second ascent (*S. C. B.*, 1936, 21:1, p. 97). William Rice, James Smith, Morgan Harris made the climb May 29, 1936, followed by Arthur Johnson, Jack Riegelhuth, Neil Ruge, May 30; William Hewlett, Hans Leschke, John Poindexter, October

10; Raffi Bedayan, Carl Jensen, Owen Williams, October 11. Williams and a companion repeated the route, November 7.

Sentinel Rock.—Olive Dyer, William Horsfall, Morgan Harris, October 10, attempted the gully just E. of the summit. A point 500 feet below the top of the gully was reached, but as the route lay chiefly on the N. face of Sentinel Rock, they were unable to see the top portion. From below, however, the last 200 feet appeared to be very severe.

Lower Brother.—Solo ascents of this point were made several years ago by William Kat and Charles Michael. Both ascended via "Michael's Ledge," a broad shelf running diagonally upward on the E. face. The first climb from the west was made by Beverly Blanks, Boynton Kaiser, Elliot Sawyer, October 21, 1934. They found a way up near the junction of the Lower Brother and Middle Brother. An envelope of the United States Geological Survey was the only record on the summit. May 28, 1936, Kenneth Adam, James Smith, Morgan Harris attempted to climb directly up the ridge formed by the union of the E. and W. faces. After climbing 500 feet, in which two pitons were used for safety, they were blocked by an overhang, where seven pitons were placed for direct aid. Rain prevented surmounting the overhang. Above this pitch the route appeared easier. DeWitt Allen, Torcom Bedayan, Kenneth Davis ascended via Michael's Ledge, May 30, roping down the W. face. They made slow progress and, overtaken by darkness, bivouacked near the base of the W. face. Olive Dyer, William Hewlett, John Poindexter, October 11, attempted a route on the W. face between the ridge route and the Blanks-Kaiser-Sawyer route. By a series of chimneys and cracks they reached a point about halfway up, but were unable to complete the climb in the time available.

Lower Cathedral Spire.—Kenneth Adam, Jules Eichorn, Bestor Robinson, Morgan Harris repeated the ascent May 30, for photographic purposes.

Gully between Higher and Middle Cathedral Rocks.—After a solo attempt by Ansel Hall some years ago, the first serious attempt on this route was made by Kenneth Adam, Leland Gale, Stewart Kimball, May 26, 1934. They were turned back by a 150-foot pitch at 70 degrees in the upper part of the gully. Two unsuccessful attempts were made in May 1935; both were stopped by the steep 150-foot wall. May 25, 1936, Kenneth Adam, Neil Ruge, Morgan Harris, with full piton equipment, climbed about 600 feet higher, overcoming the initial pitch by use of three pitons for safety. Above, moderate climbing extended for 200 feet, until the gully was blocked by a 30-foot chockstone, overhanging and dripping with water. An attempt was made to continue up the steep wall of slabs on the N. side of the gully, but after about 200 feet a smooth bulge in the wall caused a halt. October 11, 1936, David Brower and Morgan Harris returned and found the overhanging chockstone dry and passable. A small tree aided in surmounting the overhang, and the remainder of the gully proved to be easy scrambling. This was probably the first direct ascent of this gully. Halfway up, a prominent ledge runs out on the face of the Middle Cathedral Rock; reported solo ascents of the gully were probably made via the ledge and this face.

The Royal Arches.—This interesting route lies on the N. wall of the valley, at the W. end of the Royal Arches. The climbing runs E. toward the Royal Arches along steps of a broad ledge, then directly up past smaller ledges until these give out on a smooth face. It is then necessary to traverse W. to a prominent rib. Above, steep slabs lead to the top. September 9, 1935, Bestor Robinson, Howard Twining, Morgan Harris reached the first of the smaller ledges, using five pitons for safety, and drove in three pitons for direct aid in an attempt to reach the second of these ledges. May 26, 1936, Kenneth Adam, Neil Ruge, Morgan Harris reached the second ledge by delicate friction-climbing, without artificial aid. A narrow ledge, invisible from below, offered a route across to the prominent rib, but in order to reach it a swinging rope traverse across the smooth face was necessary. Owing to a late start, they were unable to climb farther. October 9, Kenneth Adam, Kenneth Davis, Morgan Harris returned and successfully completed the climb. From the narrow ledge they reached the rib by another rope traverse and the ascent of an old tree-trunk. Above, two pitons were used for safety on steep cracks and, after crossing some steep water-polished granite, the top of the wall was reached. On the whole, the climb seems somewhat easier than Washington Column.

Panorama Cliff.—Curving around from Illilouette Canyon to Vernal Fall, this wall affords one of the longest climbs of continued difficulty in the valley, involving about 1500 feet of rockwork. October 12, 1936, David Brower and Morgan Harris made what is probably the first ascent, following a route on the Vernal Fall side of the cliff. Four pitons were used for safety. Although no one pitch is as difficult as the piton traverse on Washington Column, the average difficulty of pitches seems somewhat greater, and the route-finding more intricate. An easier route can probably be found on the Illilouette side of the cliff.

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A Ski-Ascent of Dunderberg

By Robert K. Brinton

Although a previous attempt of a ski-ascent of this peak in February 1935 had been turned back by a bad blizzard,[1] we were determined to try again the following year. During our 1936 Easter vacation from U. C. L. A., Dr. Walter Mosauer and I drove to Conway Summit, north of Mono Lake on the Reno-Los Angeles highway. On Friday, April 10, an early start was made. Crampons, heavy sweaters, extra mittens, and all our regular winter equipment were taken along, for, although all signs pointed toward perfect spring weather, we knew how quickly storms could come out of a clear sky. For an hour or more we were able to carry our skis over the hard-crusted spring snow, before the sun had softened the snow enough to allow a profitable use of the skins. The route to the north base of the main peak lies about eastward from Conway Summit, over a number of hills that make intricate contours, so that a careful choice is necessary. Lunch was eaten just before

[1] *S. C. B.*, 1936, 21:1, p. 57.

the final climb up a wide gully between the east and west peaks. As we came over the last shoulder and reached the summit, we were greeted by a breathtaking panorama of the whole northern portion of Yosemite National Park. We now regretted carrying our winter equipment, for the sun was warm and only a light wind was blowing. Although the upper slopes were windblown, the lower slopes were covered with well-packed powder-snow, and the downhill run was a delight. The long, open slopes made many long, straight, fast runs safe and effortless. We skimmed down the last long *schuss* directly to the cabin door, just as the sun cast its last rays over the iced snow. A glorious day, and a wonderful ski-mountain!

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East Face of Whitney and Other Climbs

By Glen Dawson

Over Labor Day, 1936, a group climbed on the east side of Whitney. Norman Clyde, Robert Brinton, Howard Koster, and Nelson Nies went up the East Face, September 6, and left a register near the top with the names of all who have made the climb. Dick Jones, Art Johnson, and I attempted a route between the East Face Route and the Mountaineer's Route, but didn't get far, chiefly because of fresh snow. Bill Rice, Bob Brinton, and I found a route up the wall north of Ibex Park, which we called "The Stemwinder." We went on to the peak marked on the U. S. G. S. map "13,301," but shown by the contours as a thousand feet lower. We also climbed "The Pinnacle" at Pinnacle Pass.

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Michael's Minaret in a Storm

By William Rice

On August 9, 1936, Nelson Nies, Muir Dawson, and I made an ascent of Michael's Minaret under unusual circumstances. From our camp at Lake Ediza we walked across the Notch to the western talus gardens of the Minarets under a sky full of low-hanging rain-clouds. The expected came, and we sat out a light three-hour drizzle under an overhanging rock at the foot of the western face. Finally, we gave up the proposed climb as a bad job and started back. The sky, however, began to change and the sun came out, so we turned back to begin the climb. We started up the chute that leads directly up to the Portal. Wet rock made the two lower chockstones more of a task than usual and emphasized the difficulty of the famous "ladder with the lower rungs missing," which was surmounted, however, by the usual shoulder-stand. At the Portal we paused, debating the advisability of continuing in the face of the gray sea that was moiling above us. The temporary reappearance of the sun decided us. The climb was on. We climbed contentedly, though hurriedly, until within a hundred feet of the top. Suddenly it began to rain and in the increasing downpour we cautiously made our way to the cairn, where we scrawled our names, shielding the paper from the wet with our bodies.

Any thoughts we may have had about waiting out the storm on the exposed summit of Michael's Minaret were soon dissipated. Thunder not far away warned us off the peak. We started down. The rain changed to hail, piling up inches deep on the ledges. When we were only a hundred feet down, an ear-splitting, blinding flash, which seemed to strike the summit, made us hang on for very life and wonder what was next. We began to rope down. From ledge to ledge and sling to sling we progressed, tying knots with numbed fingers, and shivering, unsweatered as we were, in the intense cold. Somehow, we got down to the main ledge and gingerly picked our way through piles of hail and icy-cold miniature waterfalls to the blessed Portal, where we shivered and shivered and waited out our second storm of the day.

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A Route to Darwin Canyon[1]

By Benjamin Mason

I was very much interested in the description in a recent number of the *Sierra Club Bulletin* of a region that I consider exceptionally beautiful.[2] For the benefit of those who may wish to visit it, I am glad to offer the following directions for reaching Darwin Canyon, based on my own experience in July 1935. Follow the trail from North Lake, on North Fork of Bishop Creek, to a point just below the lower end of the upper Lamarck Lake. Cross to the left of a small ridge, then follow the bottom of a draw, up an easy grade for about three-quarters of a mile, until the ridge joins the higher rock-slide south of the center of this lake; thence, up the slide to the top. Drop down gradually into a wide valley—easy grade and good footing for several miles—directly toward the SE. corner of Mount Lamarck. The main divide will be found at the head of this basin; it is not much more than seventy-five feet high if the middle, easiest place, is free of snow. If the snow is bad, go to the right, above the snow, and keep onto the S. face of Lamarck just below the top. On the W. side of the divide the going is steep but safe. There is a good camp-site in Darwin Canyon above the small E. (highest) lake—no wood. The ridge of Mount Darwin, reached from this camp, offers many opportunities for rock-climbers, properly equipped with ropes. Near the third lower peak of the Darwin range the ridge is most delicately carved, and where it joins the next higher peak the top thins out to a sheer wall only a couple of feet thick. Looking S. and W. one sees a most remarkable grouping of slender, sharp fins, which make a veritable forest extending down the slope. On one occasion I climbed to one of the sharpest of the spires on the divide near the E. end of Darwin. A wind blew up small clouds, and it was nothing short of astounding to watch the colors change from the many shades of light-blue and green to amber and burnt umber, while gray shadows floated across the lakes as the clouds passed overhead.

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[1] North of Mount Darwin, in the Sierra Nevada (U. S. G. S., *Mt. Goddard Quadrangle)*; not to be confused with Darwin Canyon, east of Owens Valley.

[2] *S. C. B.*, 1935, 20:1, pp. 78-80.

THE SIERRA NEVADA, FROM THE VICINITY OF INDEPENDENCE
By Cedric Wright

PENDENCE

ROM THE VICINITY OF INDEPENDENCE

By Cedric Wright

UNIV. OF MICH.

Bighorn Sheep in the San Gabriel Mountains

For a number of years Bighorn Sheep have generally been considered extinct in the San Gabriel Mountains. However, recently there have been several reliable reports of Bighorn Sheep on the slopes of Mount San Antonio. William Rice writes: "On November 15, 1936, at about 9 A.M., while ascending the trail to the Sierra Club Ski Hut, I saw four mountain sheep on the opposite side of the canyon. The group, consisting of two rams and two ewes, was proceeding to the stream along a well defined game-trail when I disturbed them. They immediately turned around and ran away leisurely." It is hoped that these animals will increase, as deer have, in the past few years, in the vicinity of Harwood Lodge.

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Shepherd's Crest

The second ascent to the "Little Lost Valley" was made on August 23, 1935, by Elliot Sawyer and W. B. Augustine. They were engaged in accurately mapping the botanical and forestral types of the northern portion of Yosemite National Park. In the course of this work they made the ascent, collected specimens of each of the tiny alpine species of plants growing at that altitude, and took several photographs of the important geomorphological features. François Matthes has stated that after his further researches in the southern Sierra, and after discussion with other geologists, he is convinced that the "Little Lost Valley" on Shepherd's Crest is far more important than he had anticipated at the time he wrote his very interesting article. (*S. C. B.*, 1933, 28:1, pp. 68-80.)

BOOK REVIEWS

JEPSON'S FLORA OF CALIFORNIA[1]

Dating from the years when he served as assistant in botany to Professor E. L. Greene, at the University of California, Professor Willis Linn Jepson began the accumulation of materials toward his planned *Flora of California*. This was early in the "nineties." Large areas over the state had not been visited by any botanist, and every trip into the open, to the vales and knolls of the north coast ranges, to the little-explored Sierra Nevada, brought to hand specimens which differed in one or many points from the available descriptions in the only comprehensive work of that day, the *Botany of California*, of the California Geological Survey (published 1876-1880). Students were bringing into the laboratory plant materials of new and refreshing interest. From summer trips into the Sierra, such as a trip into the Mount Whitney region, in 1900, and from brief journeys to the southern California deserts, came facts concerning native plants, not only their distribution and organography, but also their more elusive life-histories and biologic niche. These were carefully recorded in a series of field-books begun at that time and continued to the present. Sketches of fresh flowers and fragile parts easily misinterpreted were placed with the dried specimens in the growing herbarium. With the departure of Professor Greene, in 1895, a heavier teaching program pared down the time that could be devoted to the preparation of the *Flora*. Nevertheless, it has been a rule with the author that no day should pass without some time, however brief, being devoted to its progress. It was on the basis of these accumulated notes and specimens that the first published part appeared in 1909. This comprised the four coniferous families: *Pinaceæ, Taxodiaceæ, Cupressaceæ,* and *Taxaceæ*. Additional sections appeared from time to time, and with the publication of Part Seven, in 1922, Volume One of the *Flora* was completed, except for the introductory (32) pages not yet published.

Volume Two, carrying 151 original figures, including two full-page halftones, with title page and introduction, was completed in September 1936. It concludes all the choripetalous families, those plants having their petals separate or not variously united into a tube, presented essentially in the Engler and Prantl sequence. Bibliographies and references will direct the reader who seeks further information on a given subject. Certain plants, as *Sisymbrium thalianum (Cruciferæ)* and *Sympetaleia rupestris (Loasaceæ)*, are recorded here for the first time as members of the Californian flora, along with many species and varieties new to science. The account of the family *Cactaceæ* was prepared by the late pioneer California botanist, Samuel Bonsall Parish. Field notes on distribution, ecology, and biologic aspects of species, a feature of Volume One, have been considerably extended in Volume Two. With the descriptions are discussed the Indian and Spanish Californian uses of the native

[1] *A Flora of California.* Volume Two. By WILLIS LINN JEPSON. Published by the author, Berkeley, California. 1936. 684 pages; 151 figures, frontispiece. Price, $8.00 (cloth), $7.00 (paper).

plants and historical comment on immigrant species. Thus from the account of the Tree of Heaven, "the only exotic arboreous species in California which is aggressively spontaneous," I quote:

"Historical Note.—The Chinese miners, immigrants in California in gold days, brought with them from China seed of *Ailanthus altissima*, the Tree of Heaven of their temple grounds at home. This seed they planted about the placer mining camps in the Sierra Nevada foothills. The species spread, spontaneously in many places, and its colonies are now a feature of the foothill region, especially about such oldtime mining camps as Mormon Bar (Mariposa Co.), Columbia, Valley Springs (Calaveras Co.), Angels Camp, San Andreas and Grass Valley."

Paragraphs of supplementary matter, such as "Field Notes," will prove fascinating reading in themselves, for they are well stocked with pungent bits of lore gathered from a lifetime's travels about California. A sprig is taken from the account of *Echeveria lanceolata:*

"Field Note.—Prospectors traveling over arid wastes chew the leaves of this plant when out of water. Some 'desert rats' carry it in their packs as a resource in time of need. The leaves are a little bitter, but they often serve to tide over a period of stress or even to save life in dire extremity."

JOSEPH EWAN

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PIONEER OF ALASKAN NATURAL HISTORY[2] The curiosity of Peter the Great as to how far the confines of his empire might extend eastward led to Bering's first expedition, which left St. Petersburg early in 1725, only four days before Peter's death. Five years later, his successor received the report of Bering's discoveries, and learned that Asia is not connected with America. By 1732 plans were afoot for a second expedition: "The coast of the Arctic Ocean was to be charted; astronomical position . . . established throughout Siberia; two vessels were to be built on the coast of the eastern wilderness (Kamchatka) which were to search for America from the Asiatic side." In addition to this ambitious program the Academy of Sciences planned for a "physico-biological, ethnological, anthropological, linguistic and historical survey of the same territory." This meant outfitting the "small army" involved from European Russia, and for a period of more than ten years; transporting the supplies across Siberia at a time when there were no roads through the "endless forests, swamps and tundras, and no development of natural resources"; building a port, as well as two vessels, when at last they reached their base.

The hero of this book, a young German scientist, seemed never quite to determine whether his interest centered in mammals, birds, fishes, insects, plants or minerals—and so studied and collected them all. One of our most familiar birds, the great crested bluejay, bears his name. Said to have been

[2] *Georg Wilhelm Stellar. The Pioneer of Alaskan Natural History.* By LEONHARD STEJNEGER. Harvard University Press, Cambridge, Massachusetts. 1936. xxiv+623 pages, illustrations. Price, $6.00.

"tough and indefatigable, unassuming as a child, and frugal to a degree; blessed with an indestructible humor," Steller, after enthusiastic collecting in many parts of Siberia, notably around Lake Baikal and Okhotsk and throughout the peninsula of Kamchatka, finally set sail with Bering and was the first white man to land on the Alaskan coast. It was a disastrous cruise, ending with the death of Bering and half his crew from scurvy, the wreck of their ship and its rebuilding into a smaller craft that carried the survivors safely back to Kamchatka. Steller, himself, was the victim of a misunderstanding among petty officials, that carried him twice from Tomsk to Irkutsk under unnecessary arrest. Released at last, he died of a fever before he had passed the boundaries of Siberia. The story that Dr. Stejneger tells is greater than his hero's story—a tale of incredible hardships, incredible human energy and ingenuity. Its one fault is that it gets under way too slowly, impressing upon the reader too many details of Russian bureaucracy before it swings fairly into the final stirring narrative. MARION RANDALL PARSONS

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CAMPERS' HANDBOOK[3] It is fine to receive an up-to-date, complete, and authoritative book dealing with camping technique. As the excellent books by Horace Kephart, published over twenty years ago, are now somewhat out-of-date, there is real need for a publication that covers the subject thoroughly, particularly in regard to the newer developments in equipment and in outdoor first aid. The style and content of this book is, almost by necessity, similar to Kephart's books. Like them, it covers a wide range, such as fixed camps, automobile camping, canoe cruising, pack-animal trips, bicycle touring, and knapsack trips, with all the myriad detail necessary to make the problems clear. A wide range of climatic conditions is covered—from northern Labrador to Mexico, and from canoe trips in Maine to pack-train traveling over the deserts of the West. However, the author does not in any way touch on mountaineering nor does he give much detail as to the lightweight type of knapsacking we are accustomed to. These are, perhaps, more technical matters than the scope of so general a book warrants. A valuable feature of this new book is its frequent references to specific brands of equipment and food, with addresses at which they may be obtained.

RICHARD M. LEONARD

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COOKERY IN CAMP AND TRAIL[4] This interesting little booklet lists books on camp cookery, gives several grub lists, tells where specialty foods may be secured, lists manufacturers of camp stoves, cooking utensils and other accessories, and closes with a bibliography of articles on various phases of the subject that have appeared in *Nature Magazine's* Hiking and

[3] *The Campers' Handbook.* By DILLON WALLACE. Fleming H. Revell Company, New York. 1936. 289 pages, illustrations. Price, $2.00.

[4] *Cookery in Camp and Trail.* A compilation of sources of information. Prepared by ERNEST A. DENCH. American Nature Association, 1214 Sixteenth St., Washington, D. C. 23 pages. Price, 10 cents.

Camping Forum between September 1934 and May 1936. It is well worth the trifling price to any camper. JOEL H. HILDEBRAND

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MOSAUER'S "ON SKIS" NEW EDITION[5] This new edition of Dr. Mosauer's little ski book has been definitely improved by the addition of several chapters, such as "Tempo Style and Tempo Turn," and "Ski Mountaineering," and the inclusion of new plates of line-drawings. The illustrations now total seventy, and include a number of pictorial half-tone reproductions as well as the graphic line-drawings. This compact manual continues to be one of the handiest and most helpful pocket ski-books that we know of. We are especially glad to see the chapter on ski-touring and ski-mountaineering. The emphasis on adequate preparation of equipment and party organization is well placed. More currency to the logical term "terrain jump" in place of the awkward *geländesprung!* That the telemark cannot be used on hard snow is effectively disproved by the ski-jumpers who often come to a graceful sweeping stop on the outrun with a fast telemark. However, it is granted that for devotees of the modern Arlberg-christie style there is no need for a telemark on hard snow. We question the desirability of swinging the shoulders around in the sense of the turn when executing a telemark, but it's a small point. Dr. Mosauer's contagious enthusiasm is sure to get you, and his many helpful hints should make this ski booklet of value to many kinds of skiers. LEWIS F. CLARK

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REDWOODS[6] Mr. Shirley's experience as a naturalist in the National Park Service has given him a very good idea of the kind of information that visitors to the parks and other scenic areas of the country desire. It has led him to prepare this book, which fulfills its purpose admirably. It is full of data, pleasantly presented. The book itself is unusually attractive in appearance. Nevertheless, a critical examination discloses a few points that need consideration. In the first place, the use of the name "Sierra Redwood" for the Big Tree, or Giant Sequoia, tends rather toward confusion than toward a clear conception of the differences that distinguish *Sequoia gigantea* from *Sequoia sempervirens*. The greatest defect in the book, however, is the over-emphasis on the Mariposa Grove of Big Trees. Other groves of greater extent and even greater interest are hardly more than mentioned, as, for instance, the Calaveras groves, the Garfield Grove, and the forests of the Tule River. This book first appeared a little over a year ago and is now re-issued in a revised edition in which the portions pertaining to the Coast Redwood have been substantially improved. FRANCIS P. FARQUHAR

[5] *On Skis Over the Mountains.* An Illustrated Primer on Modern Alpine Skiing. Second Edition, revised and enlarged. By DR. WALTER MOSAUER. Published by the author, 629 Gayley Ave., Los Angeles. 1936. 93 pages; illustrations. Price, 75 cents.

[6] *The Redwoods of Coast and Sierra.* By JAMES CLIFFORD SHIRLEY. (Second edition.) University of California Press, Berkeley. 1937. 84 pages, illustrations. Price, paper, 75 cents; cloth, $1.25.

PANAMINT[7] When Neill Wilson climbed Telescope Peak from Death Valley in 1927 (*S. C. B.*, 1928, 13:1) he was fascinated by the strange setting in which he found the dead embers of a mining "excitement" that had obviously at one time been something out of the ordinary. This combination of wreckage and weird surroundings set him to running down clues to the story. As a good journalist, he succeeded in gathering materials where others might have failed; and, as an artist in exposition, he has woven a story of more than ordinary interest. The search for the mythical Gunsight Mine, the discovery of Surprise Valley, the promotion and speculation with national figures taking a hand, the coming of the bad men, life in the boom town, heyday and disaster—these are the background for a succession of lively and fantastic figures of men whose kind is now forever gone. Visitors to the Panamint and Death Valley regions will find Neill Wilson's "Silver Stampede" a very lively companion, especially if they read aloud certain chapters on the spot.

FRANCIS P. FARQUHAR

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MARINE GAME FISHES[8] Although the pursuit of marine game fishes cannot be said to be officially an activity of the Sierra Club, there are no doubt many members who take more than an academic interest in this subject. After perusing this beautiful and entrancing book, recently issued from the University of California Press, I am inclined to advocate a Deep-Sea Fishing Section of the Sierra Club. Surely, no activity of the Club could have a finer textbook. The exquisitely rendered plates are alone an inspiration.

FRANCIS P. FARQUHAR

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A REVIEW OF HIMALAYAN CLIMBING[9] Sir Francis Younghusband has written fully and often on the subject of the Himalaya and Mount Everest, but he always seems to have something new to say on each occasion. His latest book on this subject contains a good deal more than the name, "Everest: The Challenge," suggests. It covers the whole field of attempts to reach the highest peaks of the Himalaya—Kangchenjunga, Kamet, Nanga Parbat, Nanda Devi, as well as Everest. Its greatest value lies in the discussion of purposes and the weighing of results, with the author's lofty point of view raising the whole subject of mountaineering out of the realm of the physical into the rarer air—and into the clouds, at times.

FRANCIS P. FARQUHAR

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[7] *Silver Stampede. The Career of Death Valley's Hell-Camp, Old Panamint.* By NEILL C. WILSON. The Macmillan Company, New York. 1937. xiv+319 pages, illustrations. Price, $3.00.

[8] *Marine Game Fishes of the Pacific Coast from Alaska to the Equator.* By LEMPI A. WALFORD. With paintings by Link Malmquist and photographs in natural color by Ralph Emerson. A contribution from the Santa Barbara Museum of Natural History. University of California Press, Berkeley. 1937. xxix+205 pages, 69 plates, other illustrations. Price, $5.00.

[9] *Everest: The Challenge.* By SIR FRANCIS YOUNGHUSBAND. Thomas Nelson & Sons, London and New York. 1936. ix+243 pages, illustrations. Price, $4.00.